

COMPUTERWORLD

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Vendor Gifts to Universities: Better to Give or Receive?

By Bill Laberis
CW Staff

PROVIDENCE, R.I. — Three years ago, the six-member computer science faculty of Brown University here was housed in a Victorian building on the edge of the campus. Computing was powered by a small mainframe, accessed by 35 terminals spread sparingly around this Ivy League campus.

Today, the computer science faculty has more than doubled in size, with plans for more growth, and is housed in a new \$1.5 million facility paid for by donations from IBM, Xerox Corp., Gould, Inc. and others. An IBM 3081 and several minicomputers are linked in a 1,000-plus-terminal broadband network, soon to be expanded by several hundred workstations provided by IBM.

Like scores of other colleges and universities, Brown has reaped the benefits of the 1981 changes in the federal tax code designed to stimulate corporate donations to higher education in a time of steadily diminishing federal aid. From most indications,

these tax code changes have been highly successful in shaking loose huge quantities of state-of-the-art equipment and expertise from the major computer vendors. In fact, in many cases, vendors are competing with one another to bankroll large donations to prestigious schools, a situation fueled in part by an earnest search by vendors for fresh talent (story on Page 8).



This corporate largess has locked leading colleges and universities in heated competition for equipment and cash donations for computer science departments. But while all this activity swirls, department heads and administrators find themselves increasingly struggling to maintain academic integrity and independence in research.

"There is a great deal of concern within the universities about doing business with business," said Andries van Dam, chairman of the computer science department at Brown. "There are some very troublesome issues here. We have to balance the need to main-

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DG Plays Catch-Up By Introducing Micros For Corporate Users

By Jim Bartimo
CW Staff

NEW YORK — Admitting openly that it is late into the market, Data General Corp. last week introduced four 16-bit microcomputers designed for use as stand-alone machines or as part of a minicomputer-based distributed data processing, factory or office automation system.

The Desktop Generation Models 10, 10SP, 20 and 30 can reportedly run software downloaded directly from DG's Eclipse minicomputer, a spokesman said, and are compatible with all of DG's 16-bit and 32-bit machines.

While the Desktop Generation is not DG's first series of microcomputers — the firm unveiled the Enterprise 1000 and 3000 in 1981 — it is the first series developed by DG to compete seriously in the personal computing market. DG's first 16-bit machines were not very successful and were subsequently taken off the market, the spokesman admitted at the press conference held here to announce the new machines.

The Desktop Generation systems have a dual-microprocessor design — incorporating both an Intel Corp. 8086 and DG Microeclipse processors — which allows them to operate under Digital Research, Inc.'s CP/M 86 and Microsoft, Inc.'s MS-DOS operating systems, as well as DG's own pro-

prietary Rdos, AOS and MP/AOS/SE operating systems. This multioperating system capability gives the micro a ready-made base of applications, the spokesman said.

The microcomputers can also function as stand-alone systems, as part of DG's Comprehensive Electronic Office system or as a clustered node on larger networks including IBM's Systems Network Architecture and X.25, he added.

The basic stand-alone system — the Model 10 — includes 128K bytes of main memory, one disk drive, a monochrome monitor and a detached keyboard. It is priced at \$3,165. The Model 10 can also be configured as part of the Comprehensive Electronic Office system with up to 512K bytes of memory, hard disk and multitasking, multiuser and advanced communications capabilities. The Comprehensive Electronic Office Model 10 workstation costs \$9,660.

The Model 20 can be configured as a two-user small business system with 256K bytes of memory, hard disk, four-line multiplexer, DG Dasher D210 terminal, printer, DG Rdos operating system and Basic software. This configuration costs \$10,640.

For the office, the Model 20 can be configured with 1M byte of memory, (Continued on Page 6)

University With Nine DP Sites In Midst of Switching DBMS

By Lois Paul
CW Staff

NEW YORK — A decision to change from one data base management system to another is by no means a casual one for a DP shop to make. It's usually only done when a user is having major problems with its current DBMS or is planning to make big changes to its entire DP environment.

It was the latter reason that prompted City University of New York to migrate from Software AG of North America, Inc.'s Adabas DBMS to Cullinet Software, Inc.'s IDMS. With eight individual DP centers at each of Cuny's colleges and a centralized DP center under his direction, Ira Fuchs, vice-chancellor for university systems, felt the need in 1980 to standardize the administrative DP operation and install a set of integrated software tools. He assigned that task to his management information systems group, which

is headed by Dr. George Goulondris, director of university systems.

Cuny's centralized DP center runs two IBM 4341 Model Group 2 processors, one of which is dedicated to VM. It also has an IBM-compatible Amdahl Corp. 470 system that is dedicated to batch processing and an IBM 3081 that runs a number of on-line systems.

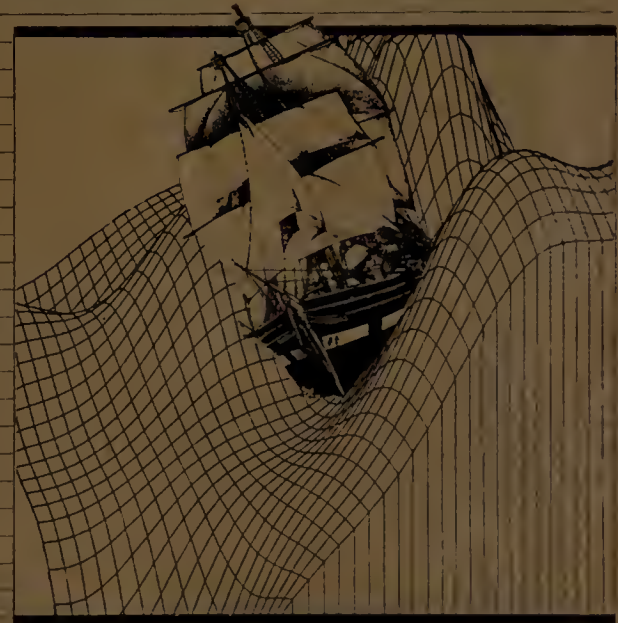
What Cuny sought in 1980 was to "standardize and centralize reporting to the central office, the board of trustees," according to data base administrator Jack Meth. It needed a DBMS that could run on all of its computers, in order to standardize maintenance, and that would include a set of integrated software development tools.

"At the time," Meth recalled, "Software AG did not have anything that worked either as a distributed data base or ran the same batch software off DOS or OS systems. We

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Congress Gets Bills That Could Raise Rates for Long Distance, Bypass Users

By Phil Hirsch
 CW Washington Bureau

WASHINGTON, D.C. — Legislation introduced here last week by three chief telecommunications policymakers could mean higher long-distance telephone rates plus charges to users who bypass local telephone company exchanges.

Two bills were introduced simultaneously, one by Sen. Bob Packwood (R-Ore.) and another by Reps. John Dingell (D-Mich.) and Tim Wirth (D-Colo.). A joint House-Senate hearing on the new legislation is scheduled later this week; the three sponsors predict that final markup will occur early in September.

Common to both the House of Representatives bill and the Senate bill is language requiring the Federal Communications Commission (FCC) to find a way of assessing users for long-distance access charges — a way that would defer any such direct charges and reduce them considerably, compared to the amounts called for in the FCC's access charge decision of December 1982.

Urgency is necessary, the sponsors explained, because that decision carries a Jan. 1, 1984, effective date. Under the decision, all telephone network users will be billed for several billion dollars in costs now paid directly just by long-distance users (through charges levied by long-dis-

tance carriers). The two bills unveiled last week repeal that decision.

The House bill, which was described in more detail than its Senate counterpart, says users who connect indirectly with a local telephone system through a private branch exchange system would have to pay the local telephone company for the direct costs of providing that interconnection and for the related "joint and common costs."

The House bill also proposes a charge "reflecting the availability of [local exchange] facilities as an alternative to the private telephone system" and a surcharge for the universal service fund.

Private systems not connecting

with the local telephone company network would pay only the "availability" charge unless the local telephone company does not offer services "comparable to those provided by the private system."

Under the proposed legislation, the new scheme would begin July 1, 1985, and be phased in over a three-year period. In the meantime, the present access charging system — a combination of industry-set charges paid by AT&T Long Lines and other common carriers to the local telephone companies — would remain in effect. The new scheme would be administered by a "joint board" composed of four state commissioners and three FCC members.

MCI to Go Digital in Fall

WASHINGTON, D.C. — MCI Telecommunications Corp., which announced a two-for-one stock split at its annual stockholders' meeting here last week along with record earnings and revenues, plans to enter the digital data transmission business this fall.

That announcement was made by President V. Orville Wright, but he declined to give any details beyond announcing that the new services would be provided by a new subsidiary, MCI Data Services Corp., head-

ed by Bob Harcharik. Harcharik was a key developer of Tymshare, Inc.'s Tymnet service.

Wright also announced that MCI is greatly increasing its transmission capacity in preparation for the upcoming divestiture of AT&T's Bell operating companies. The expansion includes use of single sideband and digital microwave systems permitting 52,584 simultaneous voice conversations to be transported on a route that presently accommodates 14,700.

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THE BAD OLD DAYS: Most of the VM Backups now in use are low-level programs, to put it charitably. (Subterranean might be a better word.) They simply use too many machine resources. And they require too much manual assistance from the operations staff.

As a result, much of the Backup, Recovery and Copying done in the nation's VM centers is just plain lousy. It's often done haphazardly...sporadically...or not at all. Heaven only knows how much this has cost in terms of destroyed data, incomplete records, and damaged reputations.

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Study Warns Senior Management Must Deal With DP Center's Problems

By Marguerite Zientara
CW Staff

MORRISTOWN, N.J. — Can your company's senior management see beyond problems in the DP department to their underlying causes?

If not, your organization may be in real trouble, according to three professors at the University of Michigan's Graduate School of Business Administration.

"Putting out minor fires as they occur helps the company to get by but does not get at the underlying problems," warned Robert K. Mautz, Alan G. Merten and Dennis G. Severance in a study titled "Senior Management Control of Computer-Based Information Systems."

"There is a real and continuing danger that apparent success in responding to criticism and complaints is actually no more than postponement of recognition of problems which become more serious with every passing day," the study maintains.

The three authors offer a list of DP-related symptoms that may alert senior managers to a serious underlying problem:

- Recurring computer system outages.
- Constant redoing of existing computer applications.
- Recurring computer system conversions.
- Repeated requests for computer

hardware replacements.

- A rapidly and continually growing information systems budget.
- Substantial reliance on outside consultants and service bureaus.
- High information systems staff turnover.
- Absence of any meaningful long-range plans for the information systems department.
- Line managers' continual dissatisfaction with the quality of information systems services.
- Persistent computer system errors.
- Budget and schedule overruns on new system development.
- A large backlog of system development and system modification requests.
- Continuing difficulty in communicating with information systems personnel (see story in box).

Assuming that those are symptoms, what are the underlying problems they indicate?

"Other than the possible incompetence of the corporate information officer, we suggest that four major problems may exist at the roots of the symptoms mentioned," the researchers said. "Unless senior management can distinguish symptoms from problems, huge amounts of effort can be expended on nothing more than postponing the inevitable."

The four possible major problems that should be examined by manag-

ers faced with such symptoms are:

- No company policy exists or has been communicated that offers adequate guidance with respect to the company's attitude toward computer usage over the long run.
- The information systems function has not found an appropriate position within the organizational structure.
- The responsibilities of those most involved in computer usage — including line managers, information systems personnel at all levels, internal auditing and general management — have not been defined.
- Adequate provision has not been made for the assimilation of the information systems function into the company organization. This includes a lack of efforts to improve communication between computer technicians and others in the company and to assure career management of information systems personnel.

The 144-page report costs \$4.50 from Financial Executives Research Foundation, 10 Madison Ave., P.O. Box 1938, Morristown, N.J. 07960.

Study Surveyed 12 Companies

MORRISTOWN, N.J. — "Senior Management Control of Computer-Based Information Systems" is the last in a three-part study of internal corporate control conducted over the last five years by authors Robert K. Mautz, Alan G. Merten and Dennis G. Severance.

For the latest report, the trio selected 12 companies "which, in our judgment, typified the various problems of computer management and control and which apparently had these problems well in hand." For each company, the researchers interviewed the chief executive officer (CEO) or a close colleague, the chief financial officer (or the person to whom the corporate information officer reported), the corporate information officer and the director of internal auditing.

The authors also visited two certified public accounting (CPA) firms and two computer vendor companies. At the CPA firms, the researchers talked with the CEO, the partner in charge of audit practice and the partner in charge of management consulting services.

At the vendor companies, the writers interviewed the CEOs, the legal counsel and executives of marketing divisions.

After completing the interviews, the researchers put their findings into a discussion paper that was presented at five research seminars, each attended by 18 to 40 people. One seminar was composed of a large group of directors of information systems from a wide variety of companies; three seminars comprised a mixture of corporate executives, internal auditors, independent accountants, information systems directors and computer vendor representatives; and the final seminar consisted of a number of CEOs.

Major Barrier: A Difference In Personalities

MORRISTOWN, N.J. — One of the major barriers to the effective use of information systems within a corporation is the all-too-common communication gap between business managers and computer technicians.

"Neither group is as interested as it should be in learning the other's terminology," reported the authors of the recently released report, "Senior Management Control of Computer-Based Information Systems."

Unless special precautions are taken, communication between the two groups can result in "considerable misunderstanding, some downright confusion, a plethora of unfulfilled expectations, an element of frustration and some very unsuccessful systems," predicted the authors of the report, three professors at the University of Michigan's Graduate School of Business Administration.

"In the worst case, the resulting unhappiness leads to employee turnover, an absence of loyalty on the part of those who feel ... treated as strangers, the dissipation of corporate energy in the building and use of ineffective systems and eventually in the burden of inadequate systems that no current employee really understands."

Basis for Schism

What is the basis for this pervasive schism between technicians and business managers? The authors trace it to "cultural differences."

Many corporate computer professionals have a mathematical or engineering background and regard their expertise to be in computer science, the researchers pointed out. "Their primary interest is in the use of the computer itself, a device which they find capable of wonders never possible before. Employment in a specific company may not be a goal in itself; it is merely a means to work with the technology they have acquired."

In contrast, most corporate employees have an educational and experiential background in business and are seeking a business career, ultimately in management. "To them, the computer may be no more than a useful tool in solving business problems," the authors pointed out. "They find little in common with those strange people in data processing who never seem to understand what we are trying to do."

Unless precautions are taken, mixing such divergent groups can present difficulties, the researchers advised. Each group "tends to assume that its own terminology and thought processes are 'normal' and should be understood by those with whom they talk."

An effort must be made by both sides to learn each other's lingo and keep each other informed, the researchers suggested.

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But 'Not in a Hurry'

Unionization Seen Coming to Vendor Firms

By Marguerite Zientara
CW Staff

Staunchly nonunion today, computer hardware and software vendor companies are expected to succumb to the attractions of organized labor — but it will take some time.

"Nothing's going to happen in a hurry," remarked Rand Wilson, a labor organizer for the Communications Workers of America (CWA) in the Boston area. "It'll be a long time before you'll see unions emerge [in that area]."

Furthermore, future high-tech unions, projected to replace the shrinking union memberships in the automobile, steel, mining, electrical and machinist industries, "will probably not resemble traditional collective bargaining arrangements," Wilson predicted. "The unions that emerge will have new leadership and will be responsive to the situations and needs of high-tech workers."

However, the new unions are expected to keep their traditional names. Known to be active in high-tech recruiting are such old-line groups as the CWA, the International Association of Machinists, United Auto Workers (UAW), International Brotherhood of Electrical Workers and United Steel Workers.

Unions Diversifying

"Many unions are diversifying," explained David B. Ellis, an attorney with Boston-based Foley, Hoag & Elliot, which counsels client firms about deflating labor organizing attempts. "The mere fact that the UAW, for instance, has in its title 'automobile' because it started out many years ago organizing the automobile industry doesn't mean it's limited [to the automobile]." The UAW currently represents both clerical workers and workers at academic institutions, he pointed out.

Ellis said unions are consolidating their efforts with coalition organizing attempts. "Unions are not going to fight over themselves as to whom they'll seek to organize. Labor unions will be joining together, if they haven't already, and picking out particular employers that they think would constitute a good plum."

While there are reports of union organizing activity in both the technology-intensive Boston area and California's Silicon Valley, there have been no takers to date. The unions themselves are very close-mouthed about their efforts because they don't want to alert management to their campaigns.

If management finds out about a campaign in the earliest stages, it can try to head off a union's efforts by

correcting its supposed offenses. Once a union election has taken place, however, "the employer can't then turn around and say, 'Here's 10 cents more an hour to make you happy,' and the union will go away," Ellis said. "That's an unfair labor practice."

Employers also cannot threaten employees with discipline if they are active for a union, cannot offer them benefits and cannot interrogate them with respect to their union activities, he added.

What can an employer do? The best strategy, Ellis said, is a preventive one whereby a company remains competitive within the industry and

"Labor unions will be joining together, if they haven't already, and picking out particular employers that they think would constitute a good plum."

keeps good lines of communication open between management and employees.

Organizing issues in the high-tech area center on money, working conditions, types of fringe benefits and relationships between supervisors and employees. The issues are the same for both the lower paid produc-

tion workers and the professional white-collar workers, Ellis noted.

While Ellis feels professionals are more likely not to organize but rather to "bargain individually for themselves," CWA's Wilson believes professionals will unionize. "Every professional group in the country is organized except for industrial professionals — lawyers, doctors, athletes, you name it," Wilson said. "Right now I'm working on a campaign with 700 Western Electric engineers [in North Andover, Mass.] who make about \$40,000 a year. We're expecting an election sometime in the fall."

Is it a trend? "You bet."

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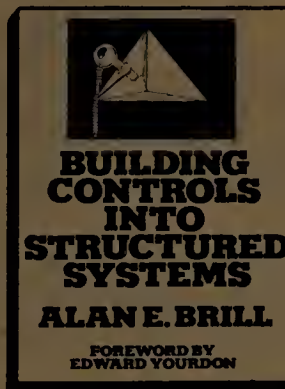
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Correction

In the In Depth entitled "The Computer Book Boom" [CW, July 18], the telephone number was incorrectly listed for Karl Karlstrom, Prentice-Hall, Inc. senior editor for Computer Science & Applied Mathematics. The correct number is (201) 592-2261.

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DEC VP Resigns to Join Ken Fisher's Next Venture

MAYNARD, Mass. — The lure of a new kind of computer company venture attracted another top industry official last week as C. Gordon Bell resigned his position as vice-president of engineering for Digital Equipment Corp.

Bell, chief architect of DEC's PDP-11 minicomputer, joined newly formed Encore Computer Corp. as chief technical officer. The 48-year-old executive had worked for DEC since 1960, when it was a three-year-old company.

Bell will join Encore founders Kenneth Fisher, former president of Prime Computer, Inc., and Henry Burkhardt, co-founder of Data General Corp.

Details of Encore's operations, which will involve the purchase of about 10 small computer companies under the Encore umbrella, were scheduled to be unveiled late last

week at a New York press conference.

A flock of ranking Prime sales and marketing personnel left that company two weeks ago to join their former boss at Encore. They included Regional Vice-Presidents Eugene F. Ringstad, George Dudley and John D. Ludden (see story on Page 93).

Prime's former Vice-President of Domestic Sales Robert Clausson and Vice-President of Investor Relations Charles Casale also joined Fisher's venture.

In announcing his resignation, Bell said, "I have enjoyed working with what I believe to be the world's best engineering organization. With such a talented base of engineers and a sound product architecture, Digital is well positioned in a very competitive marketplace."

No successor to Bell had been announced by press time.

DG Plays Micro Catch-Up

(Continued from Page 1)

three Dasher D210 terminals, multiplexer, hard disk and printer for four users. This system is priced at \$16,160.

Technical Workstation

The high-end Model 10 SP, which has 768K bytes of memory and a 15M-byte Winchester disk, and the Model 30, with 1M byte of memory, can be used as engineering and technical workstations with floating-point hardware and Fortran 77 language. The Model 10 SP can be equipped with a mouse and is available for \$12,760; the Model 30 is available as only one configuration for \$17,030.

Desktop Generation micros use DG/Blast for file transfer and DG/XAP for accessing public data networks. The DG Xodiac networking

and Comprehensive Electronic Office software capabilities can also be used, as well as communications software for IEEE-802, X.25, RJE80, Hasp and IBM's 3270, the spokesman noted.

He said, however, that additional hardware may be necessary to achieve certain communications capabilities, such as SNA.

Graphics capabilities may be added with a color monitor and additional software.

Although project head Tom West said privately that "80% of the design was done with marketing in mind," another DG spokesman said the company is not likely to market the micro through retail outlets.

More information about the Desktop Generation is available from Data General, 4400 Computer Drive, Westboro, Mass. 01580.

Protocol Links Different Micros Via Voice Lines

By Bob Johnson

CW New York Bureau

NEW YORK — A data communications protocol said to be capable of transferring data files to and from different vendors' microcomputers over voice-grade telephone lines was introduced here last week by Microcom, Inc.

The Microcom Networking Protocol (MNP) requires only minimal hardware, including Bell 212A or 103 modems, Microcom said. With higher speed modems, the protocol links larger machines, including 16-bit computers, the company added.

Described by Microcom as the "industry's first standard file transfer protocol," MNP is based on the Open Systems Interconnection (OSI) model of the International Standards Organization. It is independent of any microprocessor, personal computer or operating system; this allows dissimilar systems to exchange files using a virtual file format.

MNP accommodates real-time interactive communications and incorporates features such as flow control, data transparency, error detection and retransmission. The protocol can be used in asynchronous or synchronous modes, at a range of speeds, on leased or dial-up lines or in local-area networks, Microcom said.

Microcom said its product uses five of the seven OSI layers. Each of the layers in the model services the layers above it, but the operation of each layer is independent. Microcom explained that the MNP defines the interaction between systems at each layer. The interfaces between the layers can be different for each implementation and are optimized for each system.

The MNP is immediately available for a \$2,500 one-time licensing fee. Microcom is at 1400A Providence Highway, Norwood, Mass. 02062.

Wang Expands Supermini Line With Office Unit

By Katherine Hafner

CW Staff

LOWELL, Mass. — Wang Laboratories, Inc. last week expanded its supermini options with an entry-level 32-bit machine for small to medium-size offices that is said to support up to 32 terminals.

The Wang VS 85 was developed for users who require more processing power than can be found on Wang's existing 16-bit VS 25 and VS 45 office systems. The system takes up about the same amount of space as those machines, a spokesman said.

The VS 85 is said to be software-compatible with Wang's 16-bit machines as well as its 32-bit VS 90 and VS 100 superminis.

The VS 85 features 1M byte of main memory and offers up to 5G bytes of disk storage capacity. It also has 32K bytes of optional cache memory that provides for the support of up to 48 concurrent users, the spokesman noted.

In addition to the 32-bit CPU and main memory, the basic VS 85 system comes with Wang's VS operating system, assembler language, a 16-port serial I/O processor, a 48K-byte archiving workstation and a compiler.

Office functions of the VS 85 include word processing with list management, a spelling verifier and a readability index, as well as graphics capabilities, document transfer and a calendar facility.

Communications packages included with the VS 85 are Wangnet, Wang's local-area network, electronic mail (Mailway), IBM 3270 emulation and teletypewriter capabilities.

A typical VS 85 configuration is priced at \$78,000, approximately \$30,000 more than the VS 45 and \$10,000 less than the VS 90. Monthly maintenance is priced at \$323. Wang is located at One Industrial Ave., Lowell, Mass. 01851.

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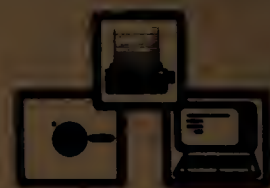
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To Swap 'War Stories'

Micro Manager Group Proposed on West Coast

By Jeffry Beeler

CW West Coast Bureau

GLENDAL, Calif. — A project manager who was recently assigned the formidable task of heading all his firm's microcomputer activities is urging other supervisors like himself to meet regularly and discuss their common problems and interests.

James Haner, who works for a large financial institution here, has proposed the formation of a professional association that would address the perplexing question of how to integrate personal computers into an existing systems organization. Tentatively known as the Microcomputer Managers Association (MMA), the group would enable its members to meet informally once a month and swap "war stories" about their personal experiences in implementing micros in both large and small businesses.

The aim of such an information

exchange would be to help attendees solve their job-related problems by providing them with practical tips about "which [microcomputer management techniques] work and which don't," Haner said.

No Other Way

"I know of no other way to make contact with other corporate microcomputer managers like myself. I want to be able to get at the people who are in charge of the control factor and find out how they're doing maintenance and how, if at all, they're handling networking."

Membership in the proposed organization is open to any corporate

manager whose job responsibility is to define policies, procedures and guidelines governing the in-house use of personal computers.

During the roughly three months since Haner began informally recruiting members for the emerging association, an estimated two dozen microcomputer managers have contacted him with requests for additional information. More than half are based in Southern California, where the group's first organizational meeting is tentatively set to take place this month. The rest of the responses came "from as far away as Illinois and Indiana," he said.

Haner, who works in his spare

time as an independent DP consultant, envisions the MMA as the West Coast counterpart to a similar microcomputer management group that began holding regular meetings a year ago in New York. Also known as the Microcomputer Managers Association, the East Coast organization already boasts about 90 members, according to the group's founder, Alan Gross, an information systems product consultant with International Paper Co.

More information about the West Coast MMA can be obtained by writing Haner at Dynamic Computer Services Co. at 38240 N. 6th St. W., Palmdale, Calif. 93550.

'Insane Situation' Led Manager To Idea of Group

GLENDAL, Calif. — The idea for the West Coast Microcomputer Managers Association (MMA) first came to James Haner last spring, shortly after he assumed his current job at a local financial institution.

As one of the information systems project managers for the institution, whose identity he asked to be kept a secret, Haner had been assigned the task of guiding his employer safely through the uncharted wilds of corporate personal computing. But because business microcomputing is still a comparatively new phenomenon with a surplus of questions and a paucity of answers, Haner considered himself woefully ill-prepared to discharge many of the duties currently confronting him.

He expressed a particular uncertainty about his prospects for dealing successfully with thorny microcomputer-related issues like maintenance, networking and user training.

Nor, as he quickly discovered, was Haner by any means alone in his admitted lack of personal computing expertise. Almost all the prospective MMA members who have expressed an interest in joining the association "are in exactly the same insane situation that I find myself in," he said.

Before long, Haner had reached the inescapable conclusion that he and others of his ilk needed some outside help if they expected to meet the challenges of their demanding new jobs successfully. "I soon realized I need someone else like myself to talk to in a relaxed, open environment," he said.

The drawback with such a mutual-self approach is that no existing users group or professional association was geared to address in depth the unique problems and issues facing today's corporate microcomputer managers. To fill the vacuum, Haner decided to create a new professional association on his own.



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Schools Reaping Returns From Tax Changes

(Continued from Page 1)

tain independence and integrity with the need to procure equipment."

Brown, which has been relatively

successful in securing sizable computer equipment grants, is "very careful not to be in a position that the university becomes an extension of the corporate research department."

Thus, van Dam's department does not conduct proprietary research for computer vendors, although donors to the department may get "the advantage of earlier technology trans-

fer, but not exclusivity" regarding computer research conducted at Brown.

Carnegie-Mellon University in Pittsburgh, Pa., takes a different approach to its relationship with corporate donors, which school officials refer to as "investors." Joint efforts in which the school performs proprietary research for certain vendors "are welcome . . . although we have to be very careful about the issue of proprietary rights," Douglas Van Houweling, vice-provost for computing and planning, said.

Van Houweling said this quasi-business relationship with larger vendors like IBM helps foster long-term relationships that can provide state-of-the-art equipment on an ongoing basis. But Van Houweling and others noted that computer departments are getting increasingly selective about the kinds of "investments" or gifts they accept. While the level of donations is rising rapidly, so, too, are maintenance and support costs associated with using the hardware.

"Unless a gift doesn't cost us a lot in maintenance and personnel, we're just not interested," said Robert Knight, manager of Stanford University's low-overhead time-sharing computer facility in Palo Alto, Calif. "We've declined more than one gift. We try to guide the vendors, and sometimes we're lucky and can work out something mutually agreeable."

Like other university officials interviewed, Knight said he has noticed a distinct increase in the size and quality of computer vendor donations in the past two years. Tax-deductible donations of computer equipment to higher education topped \$100 million last year, by conservative estimates, equal to less than 10% of the \$1 billion-plus spent for university computer use nationwide.

"Vendors realize the value of gifts to schools like Stanford," Knight said. "So do we."

Philanthropy Not the Driving Force

A multitude of forces are driving computer vendors to donate massive amounts of state-of-the-art equipment to universities and secondary schools. Pure philanthropy is a minor one.

Rather, dramatic increases in the size and frequency of vendor donations are the result of prudent marketing, a desire to expand greatly computer applications and fundamental changes in tax law.

The overall result is an apparent no-lose situation. Vendors reap significant, albeit somewhat nontangible returns; schools obtain sorely needed computing equipment; and students are generally better prepared to meet the prodigious technological challenges that lie ahead.

"We have to be damn careful not to let this thing get away from us to the point where the companies are calling the shots for computer science and engineering departments," cautioned one university administrator. "But I have to say that right now, no one's complaining too loudly."

The initial impetus for increased corporate generosity came from the Reagan administration in 1981. Somewhat complex changes in tax regulations made it more advantageous tax-wise for firms to donate new equipment to schools, provided the equipment was to be used for basic research. At the same time, the administration was reducing aid to higher education in a series of broadly condemned program cuts.

Those tax changes are still being modified to close certain loopholes. As the regulations now stand, it is possible in some circumstances for a company to reduce its corporate tax payments by an amount greater than the value of its gift. Future changes notwithstanding, it will likely remain feasible for computer vendors to make sizable equipment donations while realizing a tax reduction equal to a considerable portion of the gift's actual cost.

Philanthropy and the cost of gifts aside, academic donations represent a significant marketing and recruitment effort on the vendor's part. "It's not really charity but enlightened self-interest," said Andries van Dam, chairman of the computer science department at Brown University.

Van Dam said the Reagan-engineered tax changes have been "very successful" in encouraging vendors to broaden their base of gift recipients. To a certain extent, he said, schools such as MIT had a lock on the scarce donations as vendors clustered their eggs into a few selected baskets.

But the industry's requirements for more talent are driving vendors to other selected schools, where perhaps their equipment will stand out more noticeably, van Dam suggested. Nonetheless, MIT this year received the biggest computer vendor gift ever, a \$50 million package of equip-

IBM	<ul style="list-style-type: none"> • \$50 Million in Cash and Equipment to 20 Universities to Advance Research in CAD/CAM. • Co-Donation of \$50 Million in Equipment to MIT to Research Data Transfer. • \$15 Million Pledge to Brown University to Establish Institute for Research in Information and Scholarship. • \$2.4 Million in Graduate Fellowships to Science and Engineering Students.
DIGITAL EQUIPMENT CORP.	<ul style="list-style-type: none"> • \$ Co-Donation of \$50 Million in Equipment to MIT. • \$1.6 Million to Boston University to Fund New Computer Science Program. • Total of \$45 Million in Fiscal 1982 to Higher Education.
APPLE COMPUTER, INC.	<ul style="list-style-type: none"> • \$21 Million in Equipment to California Schools Grades K-12 for "Kids Can't Wait" Program. Company Wants a Similar Nationwide Program, But Wants Federal Tax Deductibility First via So-Called "Apple Bill." • \$500,000 to Brown University in Form of 50 Lisa Computers.
HEWLETT-PACKARD CO.	<ul style="list-style-type: none"> • Approximately \$22 Million, Mostly in Equipment, to Universities in Fiscal 1983.
WANG LABORATORIES, INC.	<ul style="list-style-type: none"> • Total of \$3.7 Million in Equipment and \$458,000 in Cash to 23 Universities and Secondary Schools in 1982.
NCR CORP.	<ul style="list-style-type: none"> • \$140,000 in Equipment to Michigan State University. • \$170,000 in Equipment to Cornell University. • Several Gifts of Complete NCR Systems to Other Universities.
HONEYWELL, INC.	<ul style="list-style-type: none"> • \$220,000 to Arizona State University. • \$30,000 to United Negro College Fund. • Total of \$3 Million in Education Contributions in 1982.

Educational Gifts by Computer Vendors

CW Chart

ment, software and maintenance co-donated by IBM and Digital Equipment Corp. Kenneth Olsen, DEC's founder, is an MIT alumnus.

"This kind of gift is immensely important to both the companies and MIT," said Prof. Michael Dertouzos, director of MIT's computer laborato-

ry and chief negotiator in the \$50 million Project Athena, so named for the Greek goddess of wisdom. Dertouzos maintained that MIT has made "no hard-core commitment" to provide anything of direct value to either DEC or IBM in return for the gift.

University in Midst of Switching DBMS

(Continued from Page 1)

realized there were shortcomings, and we began to look around at other systems."

Focusing on Adabas vs. IDMS, "we decided Cullinet's tools were really what we wanted to go with," Goulandris said. Cuny decided on IDMS about a year ago and installed the DBMS along with Cullinet's Integrated Data Dictionary, Application Development System (ADS) On-Line, IDMS/Data Communication, ADS Batch, On-Line Query, Culprit, EDP Auditor and On-Line English.

The conversion of existing applications software to IDMS is going along very smoothly because of an in-house IBM CICS-driven application development system that was designed by Tony Ribertone, manager of on-line administrative computing, and Al Gerstein, manager of on-line applications.

This software has enabled Cuny's DP staff to write compilers that generate screens in a "pseudolanguage," Ribertone said. "That is why it is fairly simple for us to convert from Ada-

bas to IDMS, because all of the screens are written in our own pseudolanguage."

The screen directs the application to read a file. "It is one module that does the I/O for Adabas, which we replaced with IDMS. So the applications still say 'Give me a record,' and basically the only thing we had to change was the I/O module."

The applications being run by the Cuny administrative system include check writing, time and leave, registration, student system, financial information system and accounting. Cuny's DP systems contain about 400 screens.

Ribertone hopes to have all of the systems converted to IDMS by the end of the year, freeing the DP staff to convert from IBM's CICS to Cullinet's IDMS/DC telecommunications monitor. Meth is planning to adjust the current one-to-one relationship of Cuny's teleprocessing system and DBMS to enable one teleprocessing system to talk to two different DBMS.

Ribertone's group plans to use the

Cullinet ADS On-Line' dialogue facility to call existing Cobol programs. In the future, changes made to the university's DP systems will be done with ADS On-Line instead of Cobol.

Because of his heavy involvement in the technical aspects of the conversion, Meth has been most concerned about data integrity. "We have some pretty sophisticated screens that do in-depth updating of the data base. If an error occurs, we have to restore the data base to its original form before all the processing started . . . that is the bottleneck we are at now," Meth said.

Ribertone said Cuny has "had it pretty easy in the data base aspect because of the fact that we had mostly flat-type files and didn't have many hierarchical files. If we were switching the other way around, we would have had a lot more trouble."

"The biggest difficulty we have had up to now is conversion of Ascii terminals to 8-byte terminals," Goulandris said. He is looking to March 1984 for full migration from Adabas to IDMS.

Commerce Starts 'Tipster Line' To Stem Exports

By Patricia Keefe
CW Staff

WASHINGTON, D.C. — If you work for a high-technology firm that deals in militarily sensitive technology and you think the guy on the other end of a purchase order might be playing footsies with the Russians, the government wants you to call this number: (202) 377-4608.

Waiting at the other end of the line will be an agent from the U.S. Department of Commerce's Office of Export Enforcement (OEE), which opened the daytime tipster line several months ago in hopes of averting illegal transfers of sensitive equipment to communist countries.

The hot line is just another aspect of Commerce's program to put some teeth into the Reagan administration's vow to crack down on illegal export operations, according to Richard Cuthbert, director of investigations at the OEE.

The tipster will not be asked to identify himself. However, he may be asked to provide specifics.

The above telephone number is operational during the day. Night-time calls can be directed to (202) 377-2989, Commerce's answering service, where callers can either leave a message or request connection to an OEE agent.

Cuthbert expects to install an 800 line soon. Until then, informants can call collect, he said.

Ten Red Flags

In addition to the hot line, the OEE is distributing a 12-page memorandum of "red flags" that may signal the presence of an illegal operation:

- The customer or purchasing agent is reluctant to provide end-user or use information, little or no customer or business background is available and delivery dates are ill-defined.

- Performance/design requirements are incompatible with the destination country's resources and environment or the consignee's line of business.

- The purported use of a product is incompatible with customary or known industrial or business practices in the purported destination country.

- The customer is willing to pay cash for large value items.

- The customer has an apparent lack of familiarity with the product's performance, design, characteristics or uses.

- The customer or purchasing agent declines an information/services contract.

- A freight forwarder is the ultimate consignee.

- An intermediary consignee is used — for example, goods are shipped to Switzerland before being shipped on to Sweden.

- Packaging or packaging requirements are inconsistent with the shipping notice — such as packaging for domestic vs. international destinations.

- Responses to questions, particularly those concerning the above points, are evasive.

Sent Hardware to Soviet Bloc

Man Pleads Guilty in Export Case

BOSTON — A \$5,000 fine, a one-year suspended sentence and two years' probation was the punishment handed Paul Carlson for his part in a series of 1979-80 business deals that sent computer hardware to Soviet bloc countries.

The first Massachusetts man to be convicted as a result of U.S. Customs' Operation Exodus, Carlson pleaded guilty to 15 violations of the U.S. Export Administration Act last week in U.S. district court here. His sentence, which could have been as stiff as 10 years in prison, was offered in return for his testimony against Brian Moller-Butcher, his former partner, according to Carlson's attorney,

James H. Wexler.

Wexler said Carlson did not dispute that he shipped electronic test equipment from the U.S. to Moller-Butcher in the UK from late 1979 to early 1980. Nor did Carlson dispute that the equipment was eventually routed to Soviet bloc countries.

Bone of Contention

What was in contention was whether the items Carlson shipped, which included an oscilloscope, desktop calculators and a somewhat outdated integrated circuit tester, actually posed a threat to U.S. security.

The items were on a U.S. Customs Department list of products that

were restricted for export to Soviet bloc countries.

Wexler maintained that the hardware shipped by Carlson, most of which was used equipment, did not jeopardize U.S. national security and was readily available on European markets.

Failing to convince the court that Carlson did not commit a crime and that the U.S. Customs list was outdated, Wexler said his client opted to testify against Moller-Butcher, who failed to appear at last week's hearing. Wexler said Moller-Butcher may be extradited to the U.S. from the UK to stand trial for his alleged participation in the case.

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Part 2: An Advanced Course takes up where *Part 1* leaves off. It teaches everything the average COBOL programmer should be using but all too often isn't. That includes table handling using the SET and SEARCH statements, subprogram linkage, the COPY library, character manipulation, the debugging verbs, indexed file handling, and the sort/merge feature. In short, a junior programmer who completes this book will be using COBOL the way the best senior programmers use it.

Beyond knowing the COBOL elements, though, a first-rate COBOL programmer should develop programs using *practical* methods of structured programming... methods that will make the programs easier to read, debug, and maintain.

That's why both parts of *Structured ANS COBOL* show you how to develop programs using structured design, documentation, and coding. So if you're just learning COBOL, *Part 1* will teach you to develop structured programs right from the start. On the other hand, if you're already programming in COBOL, *Part 2* alone will teach you structured-programming methods as it teaches you the advanced COBOL elements.

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In the past 4 years, over 34,000 people have learned COBOL using *Structured ANS COBOL*... in college and university classes, in inhouse training programs, and on their own. Here are a few reasons why the books are effective.

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In *Part 2*, you can go directly to any subject you want to know about after chapter 1 (an introduction to structured COBOL). For example, if you want to know how to write a COBOL sort program, you can start with chapter 7. If you want to know how to use the COPY library, you can go to chapter 4. But you don't have to cover a lot of material you're not interested in to get to what you want to know.

2. The books were written under the technical supervision of Paul Noll, a COBOL expert from industry. Paul has been a software specialist and training manager for Pacific Telephone; he's been manager of the COBOL project in GUIDE, a large IBM users' group; and he now consults in COBOL shops throughout the country. As a result, I'm confident this course is without equal in terms of technical excellence.

3. Much of the structured-programming material comes from a book by Paul Noll, *Structured Programming for the COBOL Programmer*. This book is currently used by dozens of businesses for inhouse training. And many companies have adopted its principles as their standard for program development. So I'm sure you'll find the structured-programming content to be practical, helpful, and a real boost to your programming skill and productivity.

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same structured techniques that are taught in *Structured ANS COBOL*.

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As a reference manual for the development of new programs, Paul created *The Structured Programming Cookbook*. Besides giving standards and guidelines for a structured COBOL shop, this book presents complete solutions for 4 business programs. By using these model solutions as guides for new program development, you don't have to start each program from scratch. This means you can spend less time on the tedious aspects of program development and concentrate on the more challenging ones.

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Sikorsky Aircraft Finds Information Center

By Katherine Hafner
CW Staff

STRATFORD, Conn. — The information center at Sikorsky Aircraft here is hardly obtrusive. Tucked away in a corner of the DP department, the center consists of one room with an IBM 3279 color graphics terminal and printer, an IBM Personal Computer, a Tektronix, Inc. graphics terminal and a Hewlett-Packard Co. plotter.

Despite the modest environment, however, the center is in constant use. Its staff of three is often overburdened with requests for the 12-hour training sessions; they are currently straining under a four-month backlog of about 50 such requests.

For Sikorsky Aircraft, a 12,000-employee division of United Technologies Corp., the 20-month-old information center is more than an interesting concept. The nation's largest manufacturer of military helicopters has come to rely as much on its information center as it does on its Computer Services Department.

Jonathan Doolittle, director of computer services at Sikorsky, began considering an information center in late 1981, a year after IBM first introduced the concept. It was at a time when the division's decision support group found that some user requests were beyond the direct scope of the group's responsibilities.

Focus on Support Demands

"It seemed to make sense that we should focus on the growing support demands we were getting from users in the division," commented Dennis Korchinski, director of the information center. A decision was made to separate half the function of the decision support group into an information center.

Established in November 1981, Sikorsky's information center is modeled closely after the original IBM concept. The center's role, as Korchinski sees it, is to "teach, answer, question, try to facilitate communication and generally make things easier."

The center's primary tools include

Mathematica Products Group, Inc.'s Ramis II data base management system and Integrated Software Systems Corp.'s Tell-A-Graf for graphics. To a much lesser degree, Speakeasy Computing Corp.'s Speakeasy for statistics and United Information Services, Inc.'s Foresight financial modeling package are also used.

In 18 months, 359 users have been trained through the information center. Most of the center's customers work on 600 terminals scattered throughout the division, tapping into two IBM 3081 mainframes (a Model D and a Model K) that run in the MVS operating environment with IBM's TSO.

About 50 microcomputers — IBM Personal Computers and IBM soft-

ware-compatible micros — are scattered throughout the division, most of them on the desks of executives as part of a United Technologies executive personal computer training program that also falls under the auspices of the information center. According to Doolittle, the ultimate purpose of the program is to develop an electronic mail system to run under the division's IBM IMS data base management system.

When the information center was first started, Korchinski went to approximately 150 users to explain the new resource tool. Enthusiasm was immediate, and the center began to receive what was to become an unending stream of user requests for training and support. The center can

claim direct responsibility for helping departments at Sikorsky shave considerable sums of money off their expenditures.

"Two years ago, none of this would have been here," commented Ron Wider, Sikorsky's director of program control, as he pointed around him to masses of graphs pasted on his conference room's wall. Wider readily acknowledges that automatically generated reports and graphs are no longer a luxury but a mainstay of daily operation.

Since availing himself of the center's resources, especially Ramis and Tell-A-Graf, Wider has been able to chart the flow of all work in his department, automate the creation of authorizing documents for all heli-

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Ron Wider, Sikorsky's director of program control.

Vital to Responding to User Support Demands

copter work and eliminate the "reams and reams" of paper and manual figuring involved in writing detailed reports. Wider claims that the information center has helped his department accrue some \$250,000 in savings from "labor hours not spent that would have been spent" without automatically generated reports and graphs.

While grateful for the help he receives from the center, Wider is well aware that the information center's role is not that of constant hand-holding. "The center provides the tools and helps us to get started, but from there it's really up to our own creativity," Wider said. "If we went to them for everything, they couldn't do it. It has to be interactive."



From left: Dennis Stephens, group leader, information center; Jonathan Doolittle, director of computer services; Dennis Korchinski, information center director.

Sikorsky Takes Novel Approach To Center's Ills

STRATFORD, Conn. — Behind every outwardly smooth operation that calls itself an information center lurks a host of problems that can be a source of tension for everyone involved.

Sikorsky Aircraft's information center has encountered the problems common to many information centers — a backlog of requests for training and support; increased use of the company's mainframe, which causes lags in response time; and a fine, almost fuzzy line between necessary and unnecessary applications. But it is Sikorsky's innovative approach to coping with such problems that sets it apart from others.

When the backlog of training requests became all but unmanageable last December, Dennis Korchinski, director of the information center, simply imposed a delay until growth leveled out. This measure also speeded CPU response time, he said.

Perhaps even more innovative is a long-range project that Korchinski hopes will alleviate constant requests from corporate end users for support. For six months, the information center has been training "interns" from Sikorsky's different departments who spend a month in the center; they then return to their departments as resident experts.

"The biggest difficulty end users have isn't in understanding the products, but the operating system," Korchinski said. That problem, which the intern program hopes to eliminate, generates more questions than the center can cope with.

As for the problem of creating work that would not otherwise exist, Korchinski concedes this is "a real issue." But, he said, "the information center is bringing additional functions to the division, such as analytic capability and report capability."

If all the work that is now largely automated were done manually, Korchinski said, chances are good that the work simply would not have been done. "But we have a user community that says [it] couldn't operate otherwise."

Reagan to Nominate Markey for NTIA

WASHINGTON, D.C. — President Reagan has formally announced his intention to nominate David John Markey to be the new head of the National Telecommunications and Information Administration (NTIA).

With the official title of Assistant Secretary of Commerce for Communications and Information, Markey would serve as chief White House advisor on telecommunications and information policy. The position has been vacant since Bernard J. Wunder Jr. resigned as NTIA head earlier this year [CW, Feb. 7].

Markey is currently legal assistant to the chairman of the Federal Communications Commission.

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Sperry Exec Says Mainframes Here to Stay

By Susan Blakeney
CW Staff

ST. PAUL DE VENCE, France — Worried about that big mainframe of yours going the way of the dinosaur? Relax. Large mainframes will survive ... and the market for them will experience a prolonged annual growth rate of 10%.

This was one of the predictions made here last week by Bill Read, vice-president and general manager of Sperry Corp.'s UK computer systems operation. Read spoke at the Sperry International Management Center during the company's annual "Seminar for the Press: The Next 10 Years," attended by computer jour-

nalists from the U.S. and Europe.

Mainframes are here to stay, Read told them, because "number crunching will always be required, and there will be larger and larger data base requirements." The mainframe, he contended, is the very "heart" of the large corporation.

Furthermore, the costs for these machines will continue to come down while their power continually increases. "By 1990," Read projected, "you will see the average computer performing 20 to 100 million instructions per second."

At the other end of the spectrum, personal computers "will become very cheap and very reliable with a

long life ... and in most cases the functionality will be much greater than the average user will need."

He argued, however, that the market is beginning to experience a glut. "I see a situation where the world could be swamped with price wars creating survival contests. Texas Instruments, [Inc.] announced a \$100 million loss for the first quarter and blamed the personal computer market."

While Read believes that the future for the personal or home computer looks grim, he contended that the concept of personal computing — which he defined as "terminals with built-in aids, such as [Digital

Research, Inc.'s] CP/M, that allow users a certain amount of processing power with which they can do local personal processing ... and provide access to the main computer system" — has a healthy enough future.

Where do minicomputers fit into the picture? Read remarked that increasingly, there is very little or no difference at all between currently available mainframes and minis. "Minicomputers have to do everything now," he pointed out. "The distinctions are gone. It's simply a matter of who makes them. If it's from Sperry or IBM, it's a mainframe; if it's from Digital Equipment Corp. or Prime Computer, Inc. or Honeywell, Inc. or Data General Corp., it's called a mini."

No National Computer

In terms of hardware, Read argued that there is no longer any such thing as a national computer. He maintained that because components come from two or three different countries, the concept of "buying British" or "buying French" is no longer a viable one.

Read cited the emergence of Japanese random-access memory (RAM) technology as one reason why there will be no more indigenous computers. "We may well see a situation where virtually all RAM chips come from Japan."

What this means is that "the trend in hardware will be toward various forms of licensing agreements, with the U.S. and the Japanese being the main providers of hardware."

With hardware revenues leveling off, Read suggested that more and more money will be derived from software applications programs. "Many suppliers of minis are beginning to realize that their future is in the sale of applications programs and allied software. To those people who doubt this argument," Read said, "let me say that IBM realizes that it has been hoisted by its own petard. For years, IBM's strength was the vast quantities of software available from software houses. Many a user stated that they were buying IBM hardware because of the abundance of software available."

Read suggested that IBM will soon become involved in the development of application software to reap some of these profits for itself. When this happens, "it will place in jeopardy many of the software houses which have traditionally made a highly successful business out of being IBM-compatible."

One more trend that Read foresees is that of distributed data processing (DDP). "I think DDP will see the completion of another cycle. I believe that distributed processing has so far failed — if we talk about true DDP, meaning mainframes linked directly to other mainframes and minicomputers. Not many such systems exist today."

"I think by the end of this decade, however, if not before, we will see all the appropriate ingredients: Lines will be available, networks will be established, but probably more important, powerful low-cost computers will be with us."



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Report Characterizes DP Crime Expert Witness

By Jim Bartimo
CW Staff

Suppose the unthinkable has happened. Despite all the precautions, someone in your DP department has been arrested and charged with a computer-related crime. The suspect will go to court and so will someone else from the DP department — the expert witness.

Just what is an expert witness and how important a

This is the final installment of a three-part series on publications dealing with computer crime recently issued by the U.S. Department of Justice. This week, Computerworld looks at the DP professional as expert witness.

role does he play in the prosecution of a computer crime? Basically, expert witnesses are employed by prosecutors and investigators because law enforcement agencies are usually lacking in technical expertise. The computer expert's role will vary from case to case, but "the depth of a given expert's involvement will frequently increase as the case develops and as more complex techni-

	Malicious Destruction Of Computer Hardware	Industrial Sabotage, Espionage, Extortion, Terrorism by Computer	Defrauding the Public Through Symbolic Imagery by Computer	Complex Financial Crimes Against Business by Computer	Diversion and Theft of Nonliquid Assets by Computer	Unauthorized Use of Computer by Employees for Private (Illicit) Purposes
Understanding Basics of Computer Processing	0	3	1	3	3	2
Advising on Sound Case Preparation and Trial Techniques	0	3	1	3	3	2
Understanding Patterns of Computer Abuse in Given Industry	0	3	2	3	3	2
Profiling Computer Felon	1	3	0	3	3	2
Detecting the Complex Computer-Related Crime	0	2	0	3	3	2
Understanding Victim Company's Operations	1	3	0	3	3	2
Understanding Victim's Hardware, Software and Its Application	1	3	0	3	3	3
Preparing Search Warrants, Subpoenas	0	2	2	3	3	3
Crime Scene Assistance	1	3	0	3	3	2
Obtaining and Preserving the Evidence	1	3	2	3	3	3
Interviewing and Interrogating Witnesses	0	3	1	3	3	2
Interpreting the Evidence	1	2	1	3	3	2
Focusing the Investigation on a Suspect	1	2	0	3	3	2
Determining Modus Operandi	0	2	1	3	3	2
Anticipating Defense Objections	0	2	2	3	3	2
Preparing the Case for Trial; Pretrial Discovery	0	2	2	3	3	2
Getting the Evidence Admitted	0	3	3	3	3	3
Advising on Cross-Examination of Defense Experts	1	2	1	3	3	2
Making Technical Presentations to Jury, Judge	0	3	2	3	3	3

Source: The Expert Witness Manual, U.S. Department of Justice

cal issues arise," according to a U.S. Justice Department report done in 1980 by Koba Associates, Inc. of Washington, D.C., and offered by the Justice Department. The Koba report, essentially a handbook for prosecutors and called "The Expert Witness Manual," gives prosecutors an idea of how to select an expert witness. But by looking at the report from the expert's point of view, the role of the data processing department's witness can be identified.

An expert witness is an individual who, "by virtue of his knowledge or skill in any broad array of computer-related professions, contributes that expertise in a man-

(Continued on Page 14)

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Report Gives Qualifications Of DP Crime Expert Witness

(Continued from Page 13)

ner that assists in the investigation or prosecution of a computer-related crime," the report noted.

This witness could be from a vendor firm, the U.S. government or the court. But if he is provided by the victimized company, the witness will be more familiar with the computer system in use and its place in the corporation.

The one drawback to using a company-provided witness is that he may fall under attack from the defense as being biased.

The qualifications for a witness will differ depending on the area of technical expertise (see chart on Page 13), but there are several requirements that distinguish the expert from the layman. Among these qualifications may be:

- A professional license, certificate or registration by a recognized professional body.
- Relevant undergraduate, graduate and postgraduate degrees.
- Specialized training beyond college that indicates familiarity with current technical developments.
- Published material or writings that indicate the expert's opinions are valued by the industry.
- Relevant teaching or consulting experience.
- Membership in professional associations.
- Prior experience with computer crime to indicate the witness has been called on in the past.
- Special status or access to privileged information peculiar to the case.

Other qualities that may Directory Profiles Micro Systems

CHERRY HILL, N.J. — Data Decisions, Inc. has released a directory profiling 170 microcomputer systems currently available from 116 vendors.

The "Personal/Microcomputer Survey" was published for the corporate micro buyer and deals with units priced less than \$20,000. It includes a quick reference summary index providing basic information on operating systems, CPU, number of users supported, basic configuration and price.

Following the index are descriptions of each product, arranged alphabetically by vendor and including classification by general type and system software.

The 56-page directory is available for \$25 from Data Decisions, 20 Brace Road, Cherry Hill, N.J. 08034.

be necessary to assist prosecutors or investigators are the ability to work as a member of a team and the ability to present ideas effectively before a group in layman's terms.

"The Expert Witness Manual" is available (PB83-159103) for \$11.50 from the National Technical Information Service, Springfield, Va. 22161.

Wanted: Mini/Micro Stories

Minicomputers and their makers are in for some stormy weather.

As microcomputer and small business system manufacturers rival the performance of the mini, users are holding off on their purchase decisions. Current mini users are turning their collars up to their machines in favor of the micro cyclone.

What can minicomputer firms do to keep current users and attract new ones? More importantly, how do users decide what type of machine is best for them?

In September, *Computerworld* will publish a Special Report. If you are a vendor

or user that has a decided point of view about the advantages offered either by a mini or small business system — or have some thoughts on why users should give a cold shoulder to the micro cold front — we would like to hear from you.

Contributors are requested to send typewritten articles, approximately five to eight double-spaced pages in length. Pictures and other graphics are welcome. Contributions should be sent no later than Aug. 26 to Senior Editor Ed Scannell, *Computerworld*, 375 Cochituate Road, P.O. Box 880, Framingham, Mass. 01701.

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These low-cost, full-duplex controllers operate at 110, 300, 1200, and 2400 bps. They're completely transparent which eliminates altering operating procedures or software. Just plug them into your system's RS232C interface, and begin error-free transmission.



Racal-Vadic has error controllers for both ends of your data network. Model VA845E is a PC card that mounts in our rack-mount chassis for use at central computer sites. Model VA855E is a single-channel unit housed in a compact desk-top cabinet for remote terminal use.

County Criticized for Switching Vendors

By Patricia Keefe
CW Staff

SPRINGFIELD, Ill. — Citing continuing problems with Honeywell, Inc. service, outdated and overextended equipment and unacceptable price quotes from Honeywell, Sangamon County officials here have undertaken what some critics see as an expensive step — switching vendors.

The move from a Hon-

eywell Level 64 system to an NCR Corp. V-8555 Group II system is expected to cost the county between \$700,000 and \$1 million. Those figures include the purchase price of the NCR system, the documentation and conversion of about 500 programs (\$465,330), the buy-out of the Honeywell leases (at least \$200,000) and finance charges estimated around \$302,970.

The county Board of Supervisors made its recent decision to convert after receiving recommendations from a county advisory committee. The "blue-ribbon" committee listed as areas of concern the county data center's lack of documentation and sufficient staff, its Level 64 system and its use of applications that did not represent the latest technology available on the current Hon-

eywell system. Specifically, the committee found the Level 64 "too small to perform the required work in a timely fashion."

Members of the Board of Supervisors who did not agree that the county should switch processors suggested that the county buy computer time from the city instead. That option was rejected by the Auditor General's Office, which said it would equal or

exceed the cost of a new system.

The county DP center stands to gain 75% more capacity when it changes over to the NCR system, which offers 2M bytes of memory and a 1G-byte disk, an NCR spokesman said. "With the amount of expansion available on that box [the 8555], I can't see that they'll ever have to trade it out," he added. The current Honeywell system has 1M byte of memory and four 200M-byte disk drives, according to county officials.

As each set of programs is documented and converted from the Honeywell to the NCR system, it will be taken off the Level 64 and run on the 8555. The entire NCR system is expected to go live by the first part of December.

Remaining Leases

As part of the deal, the county will buy out its remaining leases with Honeywell, reportedly saving about \$5,000 a month while the NCR system is being installed. The county hopes to get at least \$30,000 for the Honeywell system, for which NCR has agreed either to purchase or locate a buyer.

A sharply critical county audit of the Level 64 system was made two years ago. Some of the audit report's suggested changes were implemented, but others could not be because of the nature of the system and personnel problems, according to Board of Supervisors Chairman Richard Austin. Those problems, coupled with an accelerating demand for computer space, forced county officials almost a year ago to take an in-depth look at the county computer center, which has just about reached the limits of its capabilities, Austin said.

Saying that the Board of Supervisors was very dissatisfied with Honeywell's performance and that relations between the two were strained, former county DP director Larry England had described the situation as one in which Honeywell "messed around and let things go to pot, and now they are trying to make amends, and it's too late."

Honeywell spokesman Bill Bradley recently rejected England's assessment, contending instead that county DP personnel have consistently ignored recommendations from Honeywell.

Bradley, who said Honeywell was disappointed by the decision to replace the Level 64, said his company met all of its contractual obligations for equipment and service.

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SCOTSMAN-II handles up to eight asynchronous or synchronous channels, again with an optional integral 2400 or 4800 bps modem. It also provides a control and monitoring capability from the front panel or a connected data terminal so users can examine, reconfigure, or diagnose entire multiplexer links. SCOTSMAN-II collects data on the status and usage of the data link and reports its findings when requested.

Data Compressors

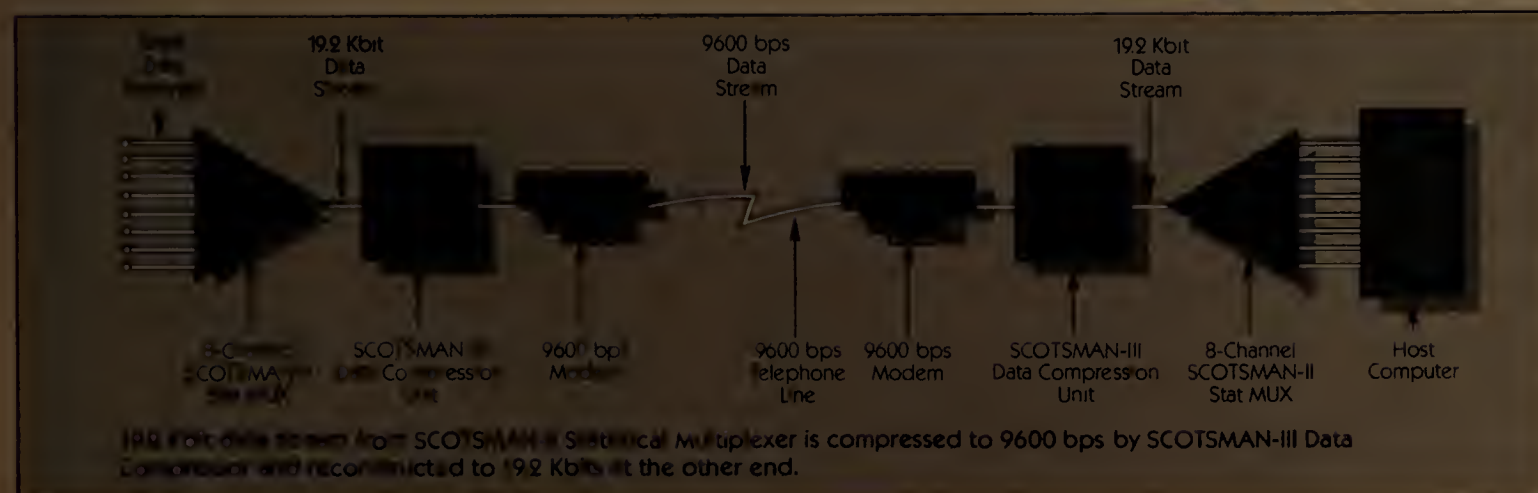
SCOTSMAN-III is a revolutionary device that saves data link users thousands of dollars. It compresses data at a 2 to 1 ratio effectively doubling the line capacity of existing communication lines.

SCOTSMAN-III can compress a 19.2 Kbit data stream, transmit it over a 9600 bps line, and reconstruct it to 19.2 Kbits at the other end. Even more dramatic — four 9600 bps BiSync data streams can be compressed over a single 9600 bps line.

Compare the high cost of leasing extra conditioned lines and modems to buying a pair of SCOTSMAN-III Data Compressors. The SCOTSMAN-IIIs pay for themselves within a few months. Consider the phenomenal savings after a year or more of use!



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International Report

FROM THE CW INTERNATIONAL NEWS NETWORK

AUSTRALIA

PERTH — A data dictionary written in standard Cobol for use on a wide range of host computers has been produced by Software Supermarket in conjunction with the Systems Research Institute of Australia. Called Superdata and priced at \$1,685, the data dictionary enables programmers to keep track of the way records, programs and files are used in a single programming project or a group of projects.

SOUTH YARRA — A real-time package has emerged as a rival to the three acknowledged dominants in

the building society field. Called Fiscal, the package runs on Perkin-Elmer Corp. equipment and is the second generation of a real-time update on-line system. Dataforce plans to export the package to the U.S. where, the company believes, American savings and loans organizations have similar requirements to Australian building societies.

BRAZIL

RIO DE JANEIRO — Abicomp, the Brazilian Association of Computers and Peripherals, opposes the purchase of technology from foreign countries except in cases of "impera-

tive need and when national projects are not viable." In a statement published here, Abicomp said "the market funding of the national industry is the major instrument that allows the development of Brazilian technology and, therefore, must be defended."

BRASILIA — The Special Department of Informatics here announced that production of IBM 4331 processors in Brazil would end, but said that three new models of the IBM 4341 have been approved for manufacture in the country. The newly approved IBM models are the MG-10, MG-11 and MG-12.

PEOPLE'S REPUBLIC OF CHINA

BEIJING — China's seven provincial computer centers will purchase seven mainframes from Hitachi Ltd. for scientific computing and data processing relevant to local industry and agriculture. Under the terms of the contract, just signed after six months of negotiations and worth over \$5 million, Hitachi will provide six M-240D computers for installation in Heilongjiang, Shanxi, Henan, Jiangsu, Zhejiang and Yunnan.

JAPAN

TOKYO — Personal computer shipments are expected to double in the next two years, according to a survey by Japan's Electronic Industry Development Association. According to the survey of 18 computer manufacturers who are members of the association and who now sell personal computers, 762,166 units worth \$1.05 billion were shipped in the fiscal year ending March 1983.

TOKYO — NEC Corp. will begin to market its Advanced Personal Computer (APC) in Europe this summer. The 16-bit APC, now selling in the U.S. and Australia, will make its European debut in the UK this month.

TOKYO — More than 116,000 general-purpose computers valued at \$22.7 billion were operating in Japan at the end of September. Those figures were up 20% in units and 12.9% in value over the previous year.

SPAIN

MADRID — The exclusive wholesaler of Radio Shack TRS-80 microcomputers in Spain has suspended payment to suppliers. With suspension of payments tantamount to bankruptcy in this country, it is feared Hispano Electronica, S.A.'s repair shops will stop operating.

BARCELONA — Commodore Business Machines, Inc. ranks first in revenues from personal computer sales in Spain, but its lead position is threatened by a pincer movement from IBM and Apple Computer, Inc., Commodore/Spain Chief Carlos Domenech said recently.

WEST GERMANY

MUNICH — Siemens AG has unveiled software called Transit-CD, designed to connect IBM's System Network Architecture and Siemens' Transdatanetwork. According to Siemens, all participant host computers enjoy equal rights, and it is not necessary to restrict any functions or to institute adaptations.

COLOGNE — The German public looks upon the computer with mixed feelings, according to a report issued by the Society for Mathematics and Data Processing located near here. Seventy-three percent of the persons surveyed equate data processing with progress, but 74% of that group also think about unemployment when they talk about the computer.

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Duo Charged With Offering To Erase Criminal Records

By Peter Bartolik
CW Staff

MIAMI — A former employee of the Dade County computer department and a legal secretary in the State Attorney's Office were arrested here late last month after allegedly receiving \$2,500 for a promise to erase a criminal record from the county's Criminal Justice Information System.

Arrested June 27 were Gerald Freeman, 27, and Claudia Johnson, 26. The arrests followed an investigation by the State Attorney's Office and the Metro Police Organized Crime Bureau.

According to Ray Havens, chief of investigations in the State Attorney's Office, Freeman and Johnson purchased cars in the spring from a used car salesman at a low price. The salesman, Havens said, pocketed some of the money rather than turning the entire sum over to the dealership. As a result, Freeman's and Johnson's cars were later repossessed.

Apparently in retaliation, Freeman, a trainee teleprocessing coordinator for Dade County, searched the Criminal Justice Information System for information on the salesman and learned that he had a criminal record for "worthless checks," Havens said. Freeman and Johnson allegedly typed up "phony warrants," tore them up in front of the salesman and told him they could delete all records on him from the system for \$2,500. The salesman refused the offer.

In May, Freeman left the state and then returned; an unauthorized absence that resulted in his firing. He then approached the salesman again to repeat his offer.

The salesman went to the police. Phone conversations were taped, and Freeman and Johnson were arrested after money changed hands, Havens said. Manuel Garcia, assistant director of the Dade County computer department, said it was his department's view that Freeman "was trying to sell something he could not deliver."

Garcia, while declining to be specific for security reasons, said his department is confident the security procedures built into the system are adequate to prevent tampering. "I'm not going to tell you any security system is foolproof, but we have one we feel is very effective, and we do not feel it was compromised," he said.

Called a 'Scam'

Sgt. Tom Tretola, in charge of the Crime Bureau section that made the arrests, said the promise to erase the file "was a scam; they were trying to get some money off [the salesman]." He said neither suspect had the capability to pull off the erasure.

Although Freeman worked in the county computer department for six months before being fired, "he didn't have access to the right codes, and it would have been almost impossible for him to get them," Tretola said.

The Criminal Justice Information System, based on an IBM 3081 and IBM 3032 running under MVS, provides information to all agencies in the county criminal justice system,

including the State Attorney's Office, police departments and public defenders, according to Garcia. About 250 terminals provide access to the data base.

Freeman has been charged with unlawful use of process, a misdemeanor punishable by up to one year in prison. Johnson was also charged with unlawful use of process and with receiving unlawful compensation, a felony punishable by up to five years in prison.

Both were released on bail, and Johnson was subsequently dismissed from her position, according to Havens. The case is scheduled to go to trial in September.

Harvard to Host Graphics Meet Beginning July 31

CAMBRIDGE, Mass. — The sixth annual Harvard University Computer Graphics Conference, which will be held at the Hyatt Regency Hotel here July 31 to Aug. 4, will focus on state-of-the-art uses of computer graphics in environmental planning, design and management.

Papers will be delivered on both theoretical and practical advances in the use of computer graphics related to satellite-generated data, cartography, natural resources planning, land information and management, building and site analysis and data base management.

Robert Aangeenbrug, president of the National Computer Graphics Association and professor at the University of Kansas, will deliver the first paper, "Computer Graphics and Geographic Information Systems," Monday at 9 a.m.

Cost of the conference is \$200 per day or \$600 for the entire conference.

More information can be obtained from Ann Quenin, conference manager, Harvard University, Graduate School of Design, Office of Special Programs, 48 Quincy St., Cambridge, Mass. 02138.

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DP Center On-Line One Week After Disaster

GREEN BAY, Wis. — No sooner had Howard Nielsen settled into his new management information systems (MIS) director's office at H.C. Prange Co. than disaster struck.

On May 4, a water main burst in the building that contained the data center for the Prange department store chain, which operates 42 stores in 16 cities. As a result, the ground beneath the building eroded, a supporting column of the building sank more than a foot, and the building was evacuated.

In the face of what could have been utter catastrophe and working under what was essentially an impromptu recovery plan, Nielsen and his staff not only managed to meet that week's payroll on time, but had

the entire system back on-line within a week.

Nielsen had been at his job as MIS director precisely three days when the nightmare began. With previous experience in an IBM shop, he was still in the midst of acquainting himself with the data center's system, based on an NCR Corp. V-8565 multiprocessor mainframe with NCR T-8270 point-of-sale controllers.

In order to meet payroll, Nielsen's department was granted limited access to the building so that the payroll files could be removed. The payroll information was run at Sheboygan County's data center, which also uses an NCR V-8500 system.

"Our data center contains all the

company's files, all the pertinent information for running the company on a day-to-day basis," Nielsen said. "If you're down for any period of time, it can be very difficult to have to shift to a manual mode."

The remaining problem was in finding another place for all of Prange's computer equipment with as little delay as possible. Nielsen was quick to find a temporary building, which had previously contained another data center 50 miles from Sheboygan in Green Bay. The machinery was loaded onto trucks and shipped to the facility here. Exactly one week after the accident, the system was running again.

The DP department is still in the temporary building, and Nielsen

said he expects to stay there for at least another year.

"The most fortunate thing was being able to find a facility that was available that quickly," Nielsen noted. He is now working on a disaster recovery plan for the current facility — just in case.

ACM/Siggraph To Present Two Awards

CHICAGO — The Association for Computing Machinery's Special Interest Group on Computer Graphics (ACM/Siggraph) has awarded its Steven A. Coons Award to Ivan E. Sutherland.

The award recognizes long-term creative impact on the computer graphics field, an ACM spokesman said. Sutherland is vice-president and technical director of Sutherland, Sproull and Associates and is a visiting scientist at Carnegie-Mellon University.

James F. Blinn has been awarded the Computer Graphics Achievement Award. This award, given yearly, recognizes outstanding recent accomplishments in computer graphics. Blinn is with the Jet Propulsion Laboratory of the California Institute of Technology.

Both award winners will be honored at the Siggraph '83 conference welcoming session on July 27 at 2 p.m. in Detroit. More information on the conference is available from ACM at 111 E. Wacker Drive, Chicago, Ill. 60601.

NSF Grant Goes To University

PHILADELPHIA — The National Science Foundation (NSF) has awarded a \$3.8 million grant to the University of Pennsylvania School of Engineering and Applied Science. The grant will be used for a major expansion of research efforts in two areas: evaluating the interaction between man and machine and making machines more flexible with their environments.

The grant is part of a five-year NSF program to stimulate experimental computer research and to attract more students into the field, the university said.

One of the goals of the university's research into man-machine interaction is to develop better natural language systems for computers that do not assume the user has an intimate knowledge of the data base, according to the university.

Other goals of the research are aimed at creating graphics interfaces and an interface that allows the user to combine natural language, computer languages and graphics, the university said.

The NSF grant will be used along with a \$1 million combined grant from IBM and the Alfred P. Sloan Foundation and a \$1 million grant from Henry Salvatori, an alumnus of the Moore School of Electrical Engineering.

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Three Companies Merge

Railroad Converging Resources to Form One Net

By Robert Batt

CW West Coast Bureau

OMAHA, Neb. — A formidable task faces the newly formed Union Pacific System — a combination of the former Western, Union and Missouri Pacific Railroads — formed after the nation's railroad industry was deregulated at the beginning of the year. The new company is attempting to converge its data processing resources into one common network, with major DP centers here and in St. Louis.

The Union Pacific System is the second largest railroad entity measured in terms of revenue (combined 1982 revenues totaled \$8.5 billion) and the third largest measured in terms of mileage; it covers 22,000 miles spread over 21 states west of the Mississippi River and has links with the Canadian and Mexican railroad systems. In the first three months of the year, its freight carriers transported over 50 million tons of goods, materials and equipment.

With tough competition coming from the nation's No. 1 railroad, Burlington Northern Railroad, and from other companies such as Southern Pacific Railroad, a streamlined DP operation is vital to success.

Seeking Commonality

"We are trying to achieve a commonality among the different DP systems, which requires a complete examination of the different methodologies of each system and arriving at one accepted way of doing things," explained Guerdon Sines, vice-president of information and communication systems at Union Pacific System. To achieve this, the company is concentrating its DP resources in its two major DP centers.

In St. Louis is based the railroad's on-line real-time systems — two IBM 3033 attached processors and a 3081 mainframe. The Omaha center, with two IBM 3081s, one 3083, two 370/168s and a 4341 processor, will deal with the cyclical batch-oriented jobs.

The San Francisco data center is now in the process of phasing out its operations. Its Burroughs Corp. and Digital Equipment Corp. mainframes and minis are either being sold off or relocated and used for internal testing purposes; its DP staff has been offered jobs in the other centers. The San Francisco operations will be transferred to the other DP centers.

Twenty regional DP sites are being scaled down to two — one in Houston, the other in Little Rock, Ark.

In making all these changes, "the biggest problem is to make certain that any differences in management styles or use of systems are resolved," Sines warned. "It is vital that we ferret out these differences because if the features of one DP center are alien to the other, we could end up with something that is completely unmanageable."

As a result, the company has begun an extensive review of its requirements in both DP centers to deal with any potential problems. Teams of DP professionals and end users examine the features of various hardware and software systems and

identify potential trouble spots.

"Up until now, the agenda of user requirements has grown faster than we have been able to develop new systems. We need to make sure that outstanding work loads can be addressed by both centers. If we are successful with this exercise, many of our seasoned systems analysts can be freed up to deal with project backlogs," Sines said.

The ultimate goal of the Union Pacific System restructure, Sines said, is to make information processing applications transparent to the end user. This will allow the company to balance its work load between the two centers, which can then also act

as each other's backup facility.

One of the most complex computer applications facing the railroad, said Sines, involves keeping an accurate inventory of rolling stock. With Union Pacific System transporting a variety of materials such as coal, soda ash, potatoes, fruits, vegetables, truck trailers and containers, extensive analysis is needed in the planning and performance assessments of various units, such as the makeup of any one particular train, the use of fuel, scheduling of crews and routes and the demand for freight cars.

Over 2,500 terminals are in use throughout Union Pacific System to allow users access to up-to-date in-

formation. For example, the company has a data base for information storage and retrieval concerning the attributes of its track structure. The system keeps an updated record of the geometry of Union Pacific System property so that the structure of bridges, for example, can be reproduced graphically when needed.

The complete restructuring of the Union Pacific System network is expected to take another two years of hard work, but, Sines claimed, it will be worth it. "It will make the entire network much more responsive to management decisions, and we will be able to act interactively on a consistent basis."

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Managers on the Move



Ronna E. Cohen

RONNA E. COHEN has been promoted to manager of corporate systems in the management information systems (MIS) department at Libbey-Owens-Ford Co. in Toledo, Ohio. She will be responsible for managing and coordinating all activities associated with acquiring and developing computer-based applications for Libbey-Owens-Ford's corporate management.

Cohen served as a corporate systems analyst in the MIS department since joining the company in 1982. She previously was a systems designer for Owens-Corning Fiberglas Corp., a programmer/analyst for Toledo Trust Co. and a computer operator for the Toledo Board of Education.

Cohen holds a bachelor's degree in business services and an associate degree in data processing technology from the University of Toledo.

...

DONNA D. HOLTON has been appointed vice-president of information systems for The Penn Mutual Life Insurance Co. in Philadelphia. She is now responsible for systems development, telecommunications, computer operations and technical research functions.

Formerly second vice-president of information systems, Holton has served as interim director of information services since the retirement of Penn Mutual's vice-president of data processing.

Holton joined Penn Mutual's data processing department in 1972. Prior to her appointment to second vice-president of information systems, she served as second vice-president of administrative services. She is a 1966 graduate of the University of Michigan.

...

Hartford Insurance Group has announced that Vice-President WILLIAM L. HARRISON has been made responsible for the Information Management Department, which performs all data processing development, technical and data center operations. In addition, operations and support ser-

vices for Hartford's domestic property, casualty and life insurance functions have been consolidated under Vice-President DONALD R. CAHILL; and Assistant Vice-President EDWARD B. SHIRES has been made responsible for systems design, training and consultation.

Harrison joined the Hartford Group in 1969, was elected an assistant vice-president in 1971 and vice-

president in 1980. He is a graduate of the University of Rhode Island and earned an MBA from Rutgers University.

Cahill joined the Hartford Group in 1977 as a secretary in the Office Administration Department. He was promoted to assistant vice-president the following year and then to vice-president. He attended St. Mary's College, Winona, Minn.

Shires joined the company's Kansas City, Kan., office in 1964 and held a number of field assignments before moving to the Hartford, Conn., headquarters in 1972 as an assistant secretary in the Commercial Casualty Underwriting Department.

Shires advanced to secretary in 1977 and to assistant vice-president and project manager for commercial lines automated systems sup-

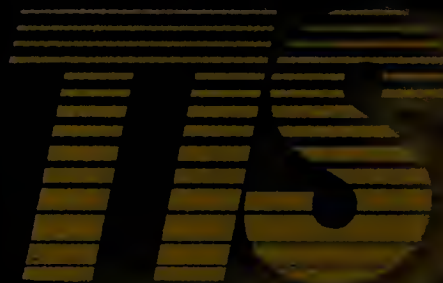
port in 1979.

Shires attended the University of Kansas in Lawrence, Kan.

...

PAUL J. CARVELLONI has been promoted to manager of management information services for the McCormick-Stange Flavor Division of McCormick & Co., Inc., the Baltimore-based international producer of seasonings, flavorings and

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Carvelloni, who joined McCormick in December 1979 as a systems analyst in the management services division, will be responsible for the development of systems software to merge the operations of McCormick and the former Stange Co. into a consolidated entity.

Previously, he held positions with the Union Trust Bank and the Social Security

Administration.

He received a B.S. degree in computer science from the Rochester Institute of Technology and an MAS degree from Johns Hopkins University.

...

ROBERT C. GRANT has been named corporate manager of telecommunications for Avco Corp. in Greenwich, Conn. He will be responsible for all telecom-

munications matters for the corporation and for the management of Avco's private telecommunications network.

Grant joined Avco from American Bell, Inc., a subsidiary of AT&T, where he had been national accounts manager since 1978. Prior to that, he was operations manager for the western division of Hilti, Inc. for four years. Between 1978 and 1980, he also

served as lecturer/instructor at the University of Nevada and at Sierra College.

He received a B.A. degree in political science in 1971 from San Diego State University and an MBA in 1974 from American Graduate School of International Management.

...

J. CHRIS DEKLE has joined the Credit Bureau, Inc. in Atlanta as assistant

vice-president of systems and programming, and C. DREW RICE has been promoted to assistant vice-president of production operations.

Dekle has more than 14 years' experience in the information services industry. He holds a master's degree from Emory University in Atlanta.

Rice began his career with the Credit Bureau in the teleprocessing division. He has served as manager of teleprocessing operations, manager of teleprocessing and logistics and, since 1981, director of production operations.

...

JOHN M. AHEARN has been appointed vice-president of planning and information services for the American Automobile Association (AAA) in Washington, D.C.

In his new position, he will be responsible for coordinating AAA's corporate planning and is also in charge of all data processing operations and the introduction of new information systems technology.

Ahearn joined AAA in 1970 as a systems analyst. He then held several positions prior to becoming managing director, planning and development, in 1981.

He holds a B.A. degree and an MBA in finance.

...

JOHN R. KENNEDY has been promoted to manager of data resources at the Kendall Co. in Boston. He will be responsible for managing all aspects of data and data bases for Kendall.

He began his career at Raytheon Co. in systems development and moved to Commercial Union Corp., where he was involved in financial systems.

Before joining Kendall, Kennedy was a member of the consulting staff of Nolan, Norton and Co., data processing management consultants.

Kendall is a graduate of Boston University's School of Management.

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Mass. Bank's Automation Speeds Accounting, Services to Customers

WORCESTER, Mass. — With banking regulations more complex than ever before, interest rates fluctuating rapidly and new money market and savings programs being offered, Home Federal Savings here decided in mid-1981 that "automation wasn't an option, it was a necessity," according to Vice-President and Control-

ler Richard Fiske.

Expanding its services and developing new programs to attract more business, Home Federal needed DP and word processing capabilities to keep abreast of the times and to inform its customers of changing developments that could mean capitalizing on a higher interest rate. "We're still traditional and old-fash-

ioned in some ways, but we're convinced that to be successful or even to survive in the '80s, banks must take advantage of the latest technology," Fiske said.

Officers of the bank, which has nine offices from here to Cape Cod and about \$320 million in assets, studied several systems. "We narrowed the field down to IBM, Saddlebrook and Wang Laboratories, Inc.," Fiske said. "We finally selected a Wang 2200 MVP, combined with Northeast Datacom's Option software. We saw this would give us word processing as well as data processing capabilities, including a general ledger and record management system, all for under \$100,000 — an amount we felt we could justify to our board of directors."

Northeast Datacom is an independent systems house that, according to Fiske, told the bank how it could get by with less, but recommended an expandable, modular system "which will accommodate our needs indefinitely."

Moreover, Northeast Datacom has assisted bank officers in writing their own programs. "We've recently added a module which will calculate budget and forecast projections in a matter of minutes," Fiske said. "Every year we must prepare a budget for the board of directors. This always took weeks and weeks of work on the part of a number of people in various departments; now all we have to do is enter the appropriate figures, tell the machine where we want it to calculate and it will print out our budget/forecast for five years or whatever time period we ask for."

During implementation of the Wang system, Fiske said, the bank officers were so confident with the system that after posting a few dummy transactions and running through a couple of reports, they immediately terminated the old general ledger system instead of running both new and old in tandem for a month or so. A two-day time lag in posting transactions has been eliminated, he said.

Susan Burch, assistant treasurer and accounting department supervisor, had no computer experience prior to the Wang installation. "The system was very easy to learn, and it's just as easy to use," Burch, an 11-year employee, said. "It's completely menu-driven; the manual guides you through every step."

Burch said the bank has utilized the word processing capabilities to enhance communications with customers.



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Bank's Investment in Micros Pays Off in Millions

By Robert Batt

CW West Coast Bureau

LOUISVILLE, Ky. — The Bank of Louisville has invested more than \$1 million in microcomputers over the past six years and has seen its assets double to \$600 million within the same time frame.

In fact, the bank has become known for being such a pioneer in the use of microcomputer technology within the banking industry that it now owns 47 leases with other Kentucky banks for the leasing of its hardware and software equipment.

"We have developed contacts and relationships with other banks which we would never have gained if we had not automated our facilities," observed Wayne Carter, the bank's vice-president.

The bank has acquired 270 Apple Computer, Inc. Apple II Plus micros that are used in a series of networks

both within the bank's headquarters here and throughout its 27 branches within Jefferson County. The bank also has one IBM Personal Computer, two Apple IIe systems and one Apple III.

Processing Loan Applications

One of the biggest uses for the Apple micros is in the processing of consumer loan applications from the 27 branch offices and seven loan production offices. The application is transmitted from an Apple in the field to a core of five Apple II Plus systems in the head office. A credit decision is made on the application and transmitted via a modem back to the branch or loan office.

This process, which formerly took at least a day when conducted manually, typically occupies less than an hour. "We now have the capability to make a decision while the customer

waits," Carter said.

Other Apple system applications include:

- Financial spreadsheet analysis, using Visicorp's Visicalc to maintain the bank's daily financial statement.

- Maintenance of data base and storage files via a network of 11 Apples in the bank's microcomputer department.

- Personnel records maintenance, allowing the bank to compile information for routine federal compliance reports within an hour instead of the former 1½ days.

- An internal bulletin board system in which the Apples are used to notify branches and loan offices of changes in interest rates, credit rates and certificate deposits.

Every branch in the bank has at least two Apple micros. In addition, every department in the bank's headquarters has at least one, including the Customer Deposit Accounts Department, the Revolving Credit Department and the data center.

Much of the data stored in the Apples is collected on Winchester disk drives and uploaded via tape to the bank's IBM 4341 mainframe system, where the data on areas such as loan applications is stored.

"We have seen a vast reduction in the flow of paper, a lot less errors in lending procedures and a much faster transfer of information. At the same time, there has been no in-

crease in staff levels," Carter reported. Since the bank installed the Apple networks, staff has been reduced by 100 to 530 through attrition, he added.

The use of personal computers within the bank began in 1978 when the bank's president, Burt Klein, recognized the need for more efficient ways of handling information if the bank was to continue making money in the highly competitive area of consumer loans. A data processing executive, Bob McElwain, was brought in to oversee the operation, and within a couple of years the Apple network was up and running.

Apple, Carter noted, was chosen because at the time it was the leading microcomputer company and because a large amount of software existed for its systems. The bank has created a pool of its own software for the machines, including an installment loan calculator and note printer program that it leases to other banks, a future value program designed to calculate future values of certificates of deposit and a program for amortizing schedules.

Packaged software used in addition to Visicalc includes DB Master (a data base management system manufactured by Stoneware, Inc.), Text Editing Program (a text editor from Software Sorcery, Inc.) and various bank disk packages from Financial Systems, Inc.

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Cobol Application Transported

Compiler Eases Mainframe-to-Micro Move

DETROIT — When a mainframe-oriented management consulting group was called in to transport a Cobol application from a large system to a microcomputer, the first problem the company faced was finding a compiler. It reviewed a half-dozen of them before it made its final selection.

For 13 years, Asist Corp. has helped utilities and manufacturing organizations develop and maintain Cobol business applications on large computer systems. The firm is called in to define and solve DP problems, either by writing custom software or guiding the in-house implementation of software.

In the process, Asist has developed the Maintenance Management System (MMS) to manage manufacturing and utility plant maintenance. Running on IBM, Burroughs Corp. and Control Data Corp. mainframes, MMS is written in several modules and manages plant maintenance, keeps track of backlog, provides scheduling tools and generates corrective and preventive work orders for plant equipment requiring maintenance or repair.

The compiler that Asist settled on was Level II Cobol from Micro Focus, Inc. of Palo Alto, Calif. "Level II Cobol allowed us to put MMS on Tele-video Systems, Inc. single- and mul-

tiuser microcomputer systems. It compiles the code very efficiently and uses less main memory than other Cobol compilers, so we can make our program modules close to 64K [bytes]," James Graves, director of DP development at Asist, said.

Most Important Feature

The most important feature of Level II Cobol, according to Graves, "is that it permits us to achieve on microcomputers everything we used mainframes to accomplish in the past."

Putting the Cobol application on microcomputers benefits Asist's customers because they save the cost

and time required to develop their own packages, he added. Asist maintains the programs; the MMS microcomputer applications provide users with the large system capabilities, but save the cost of purchasing and maintaining expensive mainframe hardware.

"The programming tools that come with Level II Cobol are another tremendous benefit," head programmer Christopher Eagle said. "For instance, with the Cobol Animator debugging tool, a programmer can run through a program one line at a time and actually see what is happening. Because some programs may be thousands of lines long, a tool such as this is extremely useful."

According to Eagle, the availability of Level II Cobol with programmer productivity tools such as Animator will help spur the placement on microcomputers of Cobol applications originally developed for and maintained on mainframe systems.

"Before MMS was available, we would go into a plant, meet with the users and data processing personnel and recommend and help implement the type of application they needed and help maintain it," Eric Kobosh, Asist's director of projects, recalled. "Now, as an increasing number of companies install microcomputers, we can immediately provide them with a complete package that's easy to maintain. As a result, we look for more and more of our clients to install microcomputers to run MMS in the future."

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CP/M Exhibit Set for Sept. 29 In Boston

BOSTON — CP/M '83 East, an international exhibition for users of Digital Research, Inc.'s CP/M operating system, will be held here from Sept. 29 to Oct. 1 at the Hynes Auditorium.

A wide range of CP/M support companies will exhibit at the show, and dozens of seminars and workshops will be featured, according to the show's sponsor.

Seminar topics will include "Introduction to Logo," "Public Domain Software," "CP/M Cards," "The Bridge From Unix to CP/M," "Introduction to Accounting Applications," "Introduction to Word Processors," "Introduction to Communications," "Networks," "Customer Training," "Customer Support," "Programmer Productivity Tools," "Software Protection and Security" and "How to Get Into the Software Business."

Special industry workshops will be held for independent software vendors, distributors, dealers and manufacturers, a spokesman said.

Entry fees are \$10 for a one-day, exhibits-only ticket and \$25 for a three-day exhibits and conference ticket.

More information on the show is available from Northeast Expositions, Inc., 822 Boylston St., Chestnut Hill, Mass. 02167.

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Feeds Into IBM, HP CPUs

Leasing of Net Gear Improves Firm's Cash Flow

SUNNYVALE, Calif. — Shugart Corp., the disk drive manufacturer that grew to more than 3,000 employees and \$260 million in revenues in less than 10 years, found that leasing rather than buying some of its communications network equipment such as terminals, printers and modems improved cash flow and conserved capital.

"With growth, the shortcomings in our communications network had become critical," recalled Craig Warp, Shugart's manager of data processing. "The computer system we had was functional, but the communications aspects had just become impractical as the company grew."

Shugart's data processing system formerly consisted of three computers — two IBM 4341 mainframes and one Hewlett-Packard Co. HP 3000. With the exception of Shugart's engineering department, the three computers handled all of the company's DP needs.

However, "we found ourselves with unacceptable response times, and each computer system required a different type of terminal," Warp said. "A diversity in terminal types caused long terminal delivery times. We could not adequately respond to the needs of our users."

As Shugart's expansion continued into other parts of the country, the

need for a fast data communications network became increasingly apparent. It, therefore, decided to install a single, common communications network for all the computer systems using protocol converters. These converters would translate the IBM bisynchronous language into asynchronous code, allowing the asynchronous terminals to talk to both the IBM 4341 mainframes and the HP 3000.

"Finding a vendor who met all our networking requirements was tough," Warp said. "Virtually everyone we talked to offered some of what we wanted, but no one satisfied all requirements. Many vendors said

they'd be coming out with additional features by mid-1983, but we couldn't wait that long."

After considering a number of purchasing options, Shugart decided to lease its equipment from United State Data Systems, which stocks computer and telecommunication equipment — including modems, multiplexers, disk drives, printers, terminals, desktop and multiuser microcomputers — from some 25 manufacturers.

"Leasing rather than buying gives us the opportunity to evaluate the equipment at a cost break," Warp said. "United State Data Systems gave us a lease with an option to buy in three years. That gives us plenty of time to evaluate the equipment first, rather than putting down a large amount of money and holding the bag before we've had time to actually see what the system will do for us."

The equipment consists of three Rixon, Inc. Data Concentration Exchange (DCX) 850s with user-selectable option cards, 240 ports, both internally and user mapped, and a DCX 836 multiplexing system at each network site. Shugart is also leasing 14 AT&T Dataphone II modems.

Now in place, the network reaches Shugart sites in Sunnyvale and Roseville, Calif., as well as the company's Boston, Dallas and Milpitas, Calif. service centers.

"The Rixon Data Network makes it possible for anyone at any of our locations to sit down at a terminal, call up a menu and get into any of the three computers," Warp said.

There are currently around 200 terminals tied to the network in the various Shugart sites, Warp said. While virtually every department in the firm is now on the network, its primary function is handling materials data.

"Now that we've got communications in place, we'll expand at a controlled rate," Warp said. "We'll probably add only 20 terminals to the network in 1983 and see how it works. The pressure is off now. We can grow the network as the company grows."

Exec Conference Slated for Sept.

SAN DIEGO — International Data Corp. (IDC) has announced plans for its 1983 Fall Executive Conference entitled "Business Communications: Challenges for the '80s." The 15th semiannual executive conference will be held Sept. 25-28 at the Hotel Del Coronado here.

Sessions will feature speakers from leading organizations in the communications industry, including the major vendors and large-scale telecommunications users. Attendance is anticipated at 350, an IDC spokesman said.

Registration is complimentary for IDC Continuous Information Services clients and \$795 for others. More information is available from Laura Greenfield at IDC, Five Speen St., Framingham, Mass. 01701.

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DBMS Boosts User Access to Hotel Chain Data

PHOENIX — As part of its effort to place more of the responsibility for their data in the hands of non-DP personnel, a lodging chain has installed an integrated data base management system.

Best Western International installed Cincom Systems, Inc.'s TIS last year as the first step toward a fully integrated corporate information system in which users maintain and retrieve their own data in an on-line, real-time environment. Best Western already utilizes a reservation network based on the Airline Control Program. Its goal is to create on-line, interactive systems in all other business areas and integrate these with the reservation system.

"We were one of the first installed users of the product when TIS became commercially available last year," said MIS manager Ray Siggins.

"We had no previous data base system in place, so we are building a state-of-the-art information system from the ground up with TIS," he said.

TIS is installed at Best Western's headquarters here on an IBM 4341 running under OS/VS1. Another 4341 at the computer center is dedicated to the reservation system. A few financial applications are still being run in batch on a minicomputer, but these are being converted to the TIS on-line system as well.

The first component of the project,

the payroll/personnel system, already has been developed and is in production under TIS. The system, built in six months using TIS' Logical User View, consists of approximately 35 on-line programs, 25 batch programs and a 15-file data base. Users maintain and access their own information using TIS Intelligent Query.

"There is no way we could have implemented this on-line payroll/personnel system in such a short time frame using conventional methods," observed data base administrator Wendell Allen. "We estimated we would have needed to write 30 report programs just to give the end users the information they want. With only three of us to work on it, the project would have taken almost a year.

"Instead, end users can now write their own queries and get their information in 10 minutes. From previous experience, I know that without TIS we'd still be writing programs instead of being in production for eight months."

Educating Non-DP Pros

Part of encouraging end users to handle their own data is educating these non-DP professionals in the use of DP tools and systems. At Best Western, the data processing department has designated a "DP Coordinator" in each user department to work with DP in setting up logical views and learning to use TIS Intelligent Query at a very detailed level.

The coordinator assists end users in the department and serves as a liaison for the creation of new logical views or special programs. This takes DP out of the cycle of requests for information unless a particular need cannot be satisfied with TIS' Intelligent Query.

"This approach has worked extremely well as a pilot project in the personnel division — so well, in fact, that we plan to educate the coordinators to write TIS comprehensive retrieval programs as well so they can help managers obtain more complicated reports," Allen said.

When the complete corporate information system is in place, decision makers will have access to data bases for such areas as reservation, financial marketing and computer equipment repair.

Siggins sees the timeliness and integration of all Best Western data as essential to sound decision making.

"Volumes of statistics that are weeks old are of no use in a decision support function," he said.

"Out-of-date reports cannot answer questions like: 'How much business are we losing along Route 80 in Indiana?' The solution to making information make sense is to integrate the statistical data from the reservation system and other data such as market analysis, demographics, reservation agent performance and economic statistics," he said.

(Continued on Page 30)



Best Western is building an integrated corporate information system that will give decision makers access to data from the reservations, financial, marketing and computer equipment repair departments.

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Net Aids Medical Center's Search for Grants

ROCHESTER, N.Y. — Just like any other going concern, profit-making or otherwise, money is the lifeblood of a medical center performing sophisticated scientific research.

At the University of Rochester Medical Center here, nearly half the \$80 million annual operating revenue is generated by proposals written by the center's staff. Three years ago, it became apparent to the center's management that it needed an efficient, automated means of producing these reports, then reproducing them with charts, graphs and other artwork for submission.

After surveying market offerings and assessing its special needs, the

center selected a network-based around a cluster of Xerox Corp. 8010 workstations which combine computing, writing and editing with the creation of charts, graphs and mathematical equations.

Charles Betz, the center's DP manager, said the Xerox system was chosen because "it was the vendor that most reasonably offered a number of workstations . . . that will handle our specialized work load while printing in a variety of fonts . . . We now have italics."

Betz said further that the center's geographical layout is conducive to Xerox's Ethernet communications network.

Each department within the center, he said, is a complete vertical organization, few of which could make use of shared logic.

Using the 8010, grant writers at the medical center will compose up to 100 proposals each month. This level of proposal generation is necessary partly to support the Strong Memorial Hospital, which the medical center operates, and the schools of medicine, dentistry and nursing for the University of Rochester, according to Jeffrey Nagle, associate director of research administration at the center.

The written proposals, most of which are earmarked for various de-

partments within the federal government, are channeled through Nagle's office. The typical proposal is 50 pages long, which Nagle said mandates tight writing and editing "and a network of machines that simplifies the process."

With a Digital Equipment Corp. Decsystem-10 processor and VAX-11 superminicomputer serving as system hosts, Betz's department provides electronic files, a laser printer and data communications service, all linked by Ethernet. The individual departments that make up the center's laboratories, health care units and research facilities tap into the system as they need to via the Xerox workstations. Data base management is accomplished by Relational Technology, Inc.'s Ingres data base management system.

Display screens at each workstation allow authors to write, modify, store and retrieve text. They can construct mathematical equations and draw charts, graphs and flow diagrams using the equivalent of an electronic template with an array of lines, shapes and symbols.

A hand-held mouse allows system users to move text and graphics about the screen, changing format as they wish from one typeface and type size to another. They can also instruct the machine to convert data to graphics form and rearrange the text to make room.

For the future, Betz's department is "looking forward to Xerox's promise of higher level applications protocols . . . so that our terminals on the DEC switch can share print services." Betz said the center will also add some Xerox 860 and 820 personal computers.

Lodging Chain Installs DBMS

(Continued from Page 28)

"Building an integrated corporate information system with this data will give managers an accurate, timely window on how the business is doing at any point in time. Like pieces of a puzzle, all data will come together to form one clear picture."

Keith Barlow, director of reservations technical development, oversees all computerized systems at Best Western. With Siggins and Allen, he has prioritized the initial development of the TIS systems.

"We have already placed in production an interim reservation reporting system," Barlow explained.

"This system contains information on all Best Western hotel current rates and sales results. It is a 'prototype' on which we will determine user requirements and teach end users to use tools like TIS Intelligent Query," he said.

"We are committed to complete on-line systems where end users maintain their own data. Using TIS, we will be able to continue to increase services to end users without adding data processing staff. TIS will accommodate the needs of our growing organization now and in the future," Barlow concluded.

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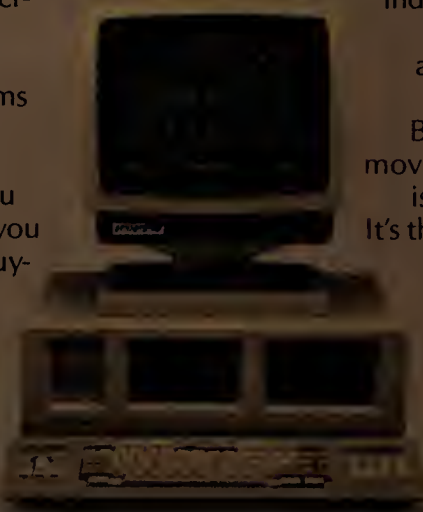
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RCA's Selectavision Planners Use DBMS to Speed Design Process

INDIANAPOLIS — In the highly competitive arena of home video systems, time is of the essence in speeding new products to the market.

So when the product assurance staff at RCA Corp.'s "Selectavision" videodisk operations was preparing for manufacture of the new product to begin, it looked for a data base management system (DBMS) to reduce development and maintenance time.

The goal was to find a tool that would speed design and implementation, reduce debugging and maintenance, make changes to the structure of existing data bases, provide quick response to user requests, allow for quick programming of new reports and turn the day-to-day operation of the system over to users with little training, according to William Myers, senior programmer.

The department found that Information Builders, Inc.'s Focus DBMS and fourth-generation language met most of its needs. "We have found that with Focus, new programs, systems and entire data base structures can be put together with great speed," Myers said. "Under ordinary conditions with Focus, a program can be written to generate a new report within four hours of the request if the data exists in the data base. In many cases, existing Focus programs with a selection option can be used and no programming is necessary."

For example, the first phase of a system developed for the player product assurance department was implemented three weeks after the assignment to write the system was first received, Myers

said. A few days later, a manager in the laboratory asked for more characters in the comment field. Although the system contained more than 40 programs, the required changes took about 30 minutes to make.

"If this had been a Cobol or Fortran-based system, a program would have been written to change the file,

and the other 40 programs would also have been changed and retested," Myers said. "This would have taken days."

In another application, the department created a system for disk production data that creates more than 30 standard reports. Besides the usual data range selections, *(Continued on Page 34)*

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signal output. And guarantees the read/write accuracy in double-density applications. New jacket construction, heat-resistant to 140°F, extends disk use without risk of mistracking. In effect, durability is redefined. And in accelerated tests against the most respected names in the industry, Maxell sustained the highest and most consistent output over time.

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Meet to Focus On Videodisks, Optical Disks

NEW YORK — The third annual Videodisk/Optical Disk Conference will be held here Sept. 19-21. Sponsored by Meckler Communications, the publisher of *Videodisc/Videotex* magazine and *Videodisc Update*, the conference will focus on topics related to the design, technology, publication and storage applications of videodisk and optical disk technology.

Registration for the conference costs \$225 per day. For two or more days of attendance, there is a \$30 per day discount.

More information is available from Meckler Communications, Department D, 520 Riverside Ave., Westport, Conn. 06880.

DBMS Propels Videodisk to Mart

(Continued from Page 33)

for all reports there is an option to select any part of the data base and create the same report by typing in IF statements, Myers said. Under the system, an engineer can select the 10 lines of detail he needs from a 50-page report and print those lines in any order desired.

"In the first six weeks of operation, more than 100 special requests were run in this fashion," Myers said.

With Focus, the two staff members in the product assurance department have implemented 10 major systems and more than 600 programs in 15 months at a low development cost, Myers added.

"A new Focus project can be implemented in less than 10% of the time required for a similar Cobol or Fortran project," Myers said. "The 30-report disk system cost less than \$500 to study, program and implement. Most of the time, a moderately complex program can be written for less than \$150. Maintenance of existing programs has been reduced by about 98%."

Since Focus can read non-Focus files, data can be collected by off-line devices and put into a regular file for editing and sorting by a Focus routine before it is added to the data base, Myers noted. In addition, Focus can be instructed to look at both active and inactive files to create reports. No data has to be transferred to the active file, he said.

Focus does have some limitations, according to Myers. "It cannot do a large number of very complex calculations," he said. "Occasionally, Fortran programs and more powerful statistical and graphics packages are needed. However, Focus can be used to gather the data and prepare files to be used by these routines, and the results can be easily put back into the data base. Focus can directly call Fortran and Cobol subroutines."

The job of systems design and specification has been simplified by the tool, Myers noted. For a Focus study, the first step is to determine what data is available. Next, a preliminary file organization is decided upon. Finally, a new data base is created, load programs are written, data is loaded into the data base and sample reports are

generated.

The user can examine final reports rather than report forms, and changes can be quickly incorporated during the programming stage, Myers said. "Also, since a large Focus data base can be split into small systems, or vice versa, it is not even necessary to know what other systems may be added later."

Because Focus also has a report generator and file maintenance function, many

programming steps are eliminated, Myers said. "Unlike Cobol or Fortran programs, which may contain more than 1,000 statements, Focus programs rarely exceed 100 statements."

"Many times, Focus programs run correctly the first time tested. After implementation, bugs are rarely found and if so, are easily fixed. Less than 2% of our time is spent on maintenance," Myers reported.

AIM Meet Set for Oct. 23-26

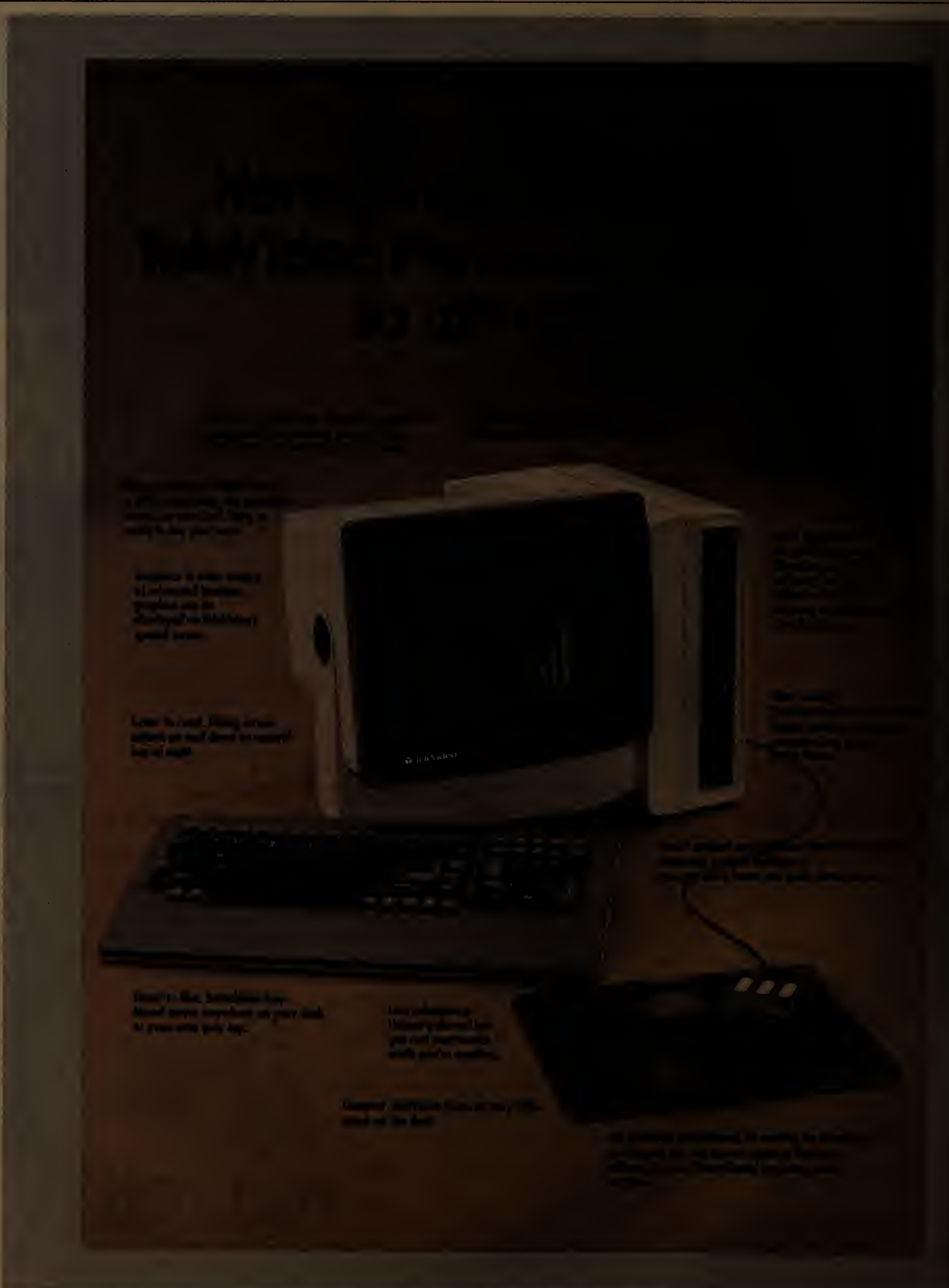
HILTON HEAD ISLAND, S.C. — "A New Look at Financial Technology" is the theme of Facts-83, the annual conference and business show sponsored by the Association of Information Managers (AIM) for Financial Institutions, an affiliate of Financial Managers Society (FMS). The show will be held here Oct. 23-26.

Facts-83 will focus on the impact of legislative initiative on the financial indus-

try, consumer behavior changes and effects on electronic delivery systems and information processing cost/performance.

Registration for the conference costs \$250 for AIM or FMS members or affiliates and \$375 for nonmembers. The fee for spouses or guests is \$75.

More information is available from AIM at Suite 2221, 111 E. Wacker Drive, Chicago, Ill. 60601.



To Focus on Opportunities for Higher Education

Educom Meet to be Held Sept. 19-21 at Stanford

STANFORD, Calif. — "Opportunities in Communications and Information Technology for Higher Education" will be the theme of the 19th annual Educom Conference at Stanford University Sept. 19-21. Educom, a nonprofit consortium of more than 400 colleges and universities, was founded in 1964 to promote the use of computing, communications

and information technology in higher education.

About 400 are expected to attend the conference, which will be hosted by the University of California, the California State University system and Stanford, and will be cosponsored by the American Council on Education. Participants reportedly will include both computer professionals and senior univer-

sity officers interested in computer applications.

On Sept. 20, several on-campus site visits are planned to show how Stanford uses computer-based technology in support of instruction, research and administrative programs. The following day, participants may visit Silicon Valley firms, including Apple Computer, Inc. and Rolm Corp.

Registration before Sept. 1 costs \$195 for members of Educom, \$295 for nonmembers and \$25 for students. After Sept. 1, the fees are \$245 (members), \$345 (nonmembers) and \$50 (students).

Further information and registration materials can be obtained from Cathy Schai-ble at Educom, through P.O. Box 364, Princeton, N.J. 08540.

IFEBP Gives Details On Meet Set Oct. 10-12

PALM SPRINGS, Calif. — The International Foundation of Employee Benefit Plans (IFEBP) recently released details of the three-day 1983 EDP Institute Conference it is sponsoring here at the Canyon Hotel Oct. 10-12 for those involved in data processing of employee benefit plan records.

Topics and speakers include "Computer Concepts and Terminology" and "The Care and Feeding of Mini-computers," Richard A. Kaimann, Ph.D.; "Technological Changes and Organizational Control," David E. Barton of Resource Information Management Systems, Inc.; "Deciding on Computerization," Robert A. DeCori of Kelly and Associates, Inc.

Several other topics, such as selection of hardware and development of software, will also be covered.

Cost of the conference is \$390 for IFEBP members and \$465 for nonmembers. More information is available from the foundation through P.O. Box 69, Brookfield, Wis. 53005.

Workshops Out For Internal Use

CARDIFF, N.J. — Plum Hall, Inc. has announced that its seminar materials for its C Programming, Advanced C Topics and Unix courses are available for unlimited internal use.

The C Programming workshop is an introduction to the language and is aimed at programmers. Advanced C Topics covers efficiency, portability and other software engineering topics for experienced C programmers. The Unix workshop emphasizes software development for introductory audiences.

Use of the course material costs \$10,000 per course. Plum Hall is at 1 Spruce Ave., Cardiff, N.J. 08232.

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THE MCGRAW-HILL COMPUTER HANDBOOK

Harry Helms, Editor

This mammoth computer guide "presumes no prior knowledge" in order to appeal to the general consumer. But no market claim can mask

the sophistication level — this compendium of previously published works was bound for the serious business user. Because more than 20 experts contributed articles (many written in the late '70s), there is no one guiding hand to make sure difficult concepts are reinforced in succeeding chapters. Careful reading is required.

High-level languages such as Basic, Cobol, Fortran, Pascal and PL/I warrant separate chapters. Practical essays on character printers, graphics

Off the Press

plotters and interfaces mix with less tangible topics such as artificial intelligence, voice recognition and robotics.

The glossary and 450 illustrations adequately aid comprehension. The handbook can be used for quick reference or read continuously to achieve a better understanding of relationships between concepts.

The gratuitous overview by Adam Osborne misdirects the reader into a short analysis of de facto standards for micros. Read on — the handbook soon achieves the depth and usefulness typical of a McGraw-Hill reference.

Hardcover, 992 pages, \$79.50, ISBN 0-07-027972-1. McGraw-Hill Book Co., 1221 Ave. of the Americas, New York, N.Y. 10020.

THE DATA FACTORY: DATA CENTER OPERATIONS & SYSTEMS DEVELOPMENT

By Edward G. Roeske

For the "data factory" to reach maximum output, the data center operations and systems development groups need to increase communication. The isolation of the data center must be broken and its staff involved in the systems development life cycle. Too often the information systems manager comes from the ranks of systems development and looks on data center operations with ignorance, if he looks at all.

The author proposes the position of operations analyst as the focal

point of the new communication. This job requires a superior computer operator, someone who understands data center operations and has earned the trust of his staff. The likely choice is the senior computer operator.

The operations analyst becomes part policy-setter, part politician. Roeske argues that to meld data center operations and systems development effectively, the new position must bear the authority to question the procedures and policies of both groups.

This slim paperback spends more time than necessary describing data center operations and systems development functions. Roeske hits his stride in explaining how the two can and should work together.

Softcover, 104 pages, \$17, ISBN 0-917072-34-0. Yourdon Press, 1132 Ave. of the Americas, New York, N.Y. 10036.

DRP: DISTRIBUTION RESOURCE PLANNING

By Andre J. Martin

DRP extends material requirements planning (MRP) out of the manufacturing plant and into the distribution centers. Martin contrasts DRP with order point systems, which request shipments when a specified inventory level has been reached. DRP orders according to what is needed by taking into account market peculiarities.

The book presents numerous ex-



'This Was Once the Club Hoity-Toity. They Still Have Three Months Left on Their Contract ...'

Off the Press

amples of DRP's affect on various distribution centers' on-hand balance, safety stock, lead time and order quantities. DRP can, Martin says, have an impact on "almost 90% of the physical distribution costs."

DRP predicts problems — probably its chief asset to any company. This system controls material as it moves not only from distribution center to customer but also from the manufacturing facility to distribution. The final chapter brings up the subject of management's difficulties instituting DRP but ends the book without offering much guidance.

Hardcover, 305 pages, \$25, ISBN 0-13-220723-0. Oliver Wight Limited Publications, 85 Allen Martin Drive, Essex Junction, Vt. 05452 and Prentice-Hall, Inc. Englewood Cliffs, N.J. 07632.

FIGHTING COMPUTER CRIME By Donn B. Parker

The book begins with Mike Hansen's "almost perfect" wire transfer scheme and proceeds with tales of data diddling, superzapping, scavenging, impersonation and other crime methods. But unlike Parker's previous *Crime by Computer*, the intent is not to shock people into awareness of the security problem. The message now is how procedures should change to thwart crime by computer.

The author calls for a special code of ethics to apply to what the public often considers "thinking machines"

or "absolute truth producers." And new laws must match the specifics of computer crime. Two programmers stealing computer time to rescore sheet music were convicted of mail fraud. Striking maintenance engineers sabotaged their company's punched paper tape devices and could be convicted only under a law normally applying to obscene telephone calls. Clearly, laws, judges and prosecutors must adjust to computer crime.

Hardcover, 365 pages, \$17.95, ISBN 0-684-17796-X. Charles Scribner's Sons Publishers, 597 Fifth Ave., New York, N.Y. 10017.

CATCHING UP WITH THE COMPUTER REVOLUTION Lynn M. Salerno, Editor

Twenty-nine practical articles from the *Harvard Business Review* comprise this collection, targeted at the manager who needs to catch up with the computer revolution. The book presents a solid, business view of computers with the range and depth expected from the *Harvard Business Review*.

The DP manager can read this interesting non-DP perspective of the computer revolution which focuses on how traditional management should interact with management information systems. The articles are decidedly managerial, rather than technical, in viewpoint.

Hardcover, 539 pages, \$22.95, ISBN 0471-87594-5. John Wiley &

Sons, Inc., 605 Third Ave., New York, N.Y. 10158.

THE ENTREPRENEURIAL LIFE By A. David Silver

"Who is the entrepreneur?" asks the author, a venture capitalist who has raised \$220 million in the last 12 years. More importantly for the reader, "What does it take to become a successful entrepreneur?" Heart — that's the character trait needed to fuel the flight from the safe DP world and launch a new venture with idealism and courage.

Silver verges on the maudlin, as when he tells of the 200 entrepreneurs in one room, all crying real tears as they relive their move from "the safe and the sure to the unknown and the unsure."

The book relies on a questionnaire mailed to 100 entrepreneurs who had amassed at least \$20 million when their companies went public. A very high number — 54% — answered, indicating a willingness on the part of these business adventurers to talk about themselves. Silver listened, and in this book he gives the reader an inside look at the motivations, strengths and weaknesses of successful entrepreneurs. The combination of practical advice and personal stories makes for a quick read.

Hardcover, 259 pages, \$19.95, ISBN 0-471-87382-9. John Wiley & Sons, Inc., 605 Third Ave., New York, N.Y. 10158.



Books of Note

HARDWARE AND SOFTWARE CONCEPTS IN VLSI, edited by Guy Rappa: 576 pages, 300 illustrations, \$42.50, ISBN 0-442-22538-5. Van Nostrand Reinhold, 135 W. 50th St., New York, N.Y. 10020.

AUTOMATION, by John Diebold: 221 pages, \$14.95, ISBN 0-8144-5756-8. Amacom Book Division, American Management Associations, 135 W. 50th St., New York, N.Y. 10020.

TELECOMMUNICATIONS SYSTEMS AND SERVICES DIRECTORY (Issue No. 1), edited by John Schmittroth Jr. and Martin Connors: 218 pages, \$150 (includes three issues), ISBN 0738-3045. Gale Research Co., Book Tower, Detroit, Mich. 48226.

COMPUTER SECURITY HANDBOOK, by the Computer Security Institute: 500 pages, \$75. Computer Security Institute, 43 Boston Post Road, Northborough, Mass. 01532.

THE POLITICS OF PROJECTS, by Robert Block: 131 pages, \$19.75, ISBN 0-917072-35-9. Yourdon Press, 1133 Ave. of the Americas, New York, N.Y. 10036.

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Medical Services Firm Automates Billing System

SANTA BARBARA, Calif. — Back in 1979, 911 Emergency Services, Inc. here saw a large expansion coming and realized that it had to bring its billing system up to date to meet the challenge. The privately held company provided emergency medical services to three areas in March 1979, when the decision to automate was made. The firm employed six full-time employees in the accounting department; service records were kept on

typewritten cards that required 10 to 15 minutes each to initiate or revise and were stored in a rotary file; and the company paid an average \$4,500 monthly charge to an outside computer service bureau for invoicing and Medicare and Medi Cal forms preparation. Rejection rates on the Medicare/Medi Cal forms were high and collection rates were low, according to general manager Jim Ridenour. The only billing service available through the service

bureau were monthly statements. **Under Contract** Now 911 Emergency Services is under contract to provide services to Santa Barbara and San Mateo counties, the city of Tracy and also to communities in Stanislaus, San Joaquin, Tulare and Kings counties. Monthly calls have increased from the 1,500 level of 1979 to about 4,400. In contrast, the accounting staff has been reduced

from six clerks to three data entry personnel. Eliminating the monthly service bureau fee paid back in just one year the company's cost of implementing a \$60,000 in-house computer system, according to Ridenour. The company selected a Digital Equipment Corp. Datasystem 576 based on a PDP-11/23 minicomputer with 2M bytes of main memory and 20M bytes of disk storage. It also selected five VT100 CRT terminals, an LA-180 printing terminal and a

300 line/min printer. The supplier was Franklen Computer Systems, Inc., the authorized DEC dealer in Pasadena, Calif., which also provided the specialized software that 911 Emergency Services required. Custom software from Franklen included Emergency Medical Service data capture, accounts receivable, statistics and fixed assets. General ledger, accounts payable and payroll software were produced by General Minicomputer Business Applications, Inc.

"Software was the key item as far as I was concerned," Ridenour said. "I wanted a software package that was specifically written for ambulance services, not one that had been adapted from some other business."

Expansion Ideas

Other systems were considered, but DEC's was selected "because the company had definite expansion ideas," according to controller Jim Felter, and company officers believed the Datasystem 576 was most accommodating to those future plans.

Data entry personnel receive trip information from all of the company's operations and enter into the computer — on the average of three minutes per form — all relevant information such as mileage and extra-charge items.

The company abides by nine different billing schedules in accordance with its various service contracts.

The system provides every-other-day invoicing to private parties at the rate of 1,500 to 2,000 statements an hour and uniform billing schedules for county and municipal governments. It automatically maintains an old accounts receivable file showing all activity for 30-, 60-, 90- and 120-day periods, and, with the software package from Franklen, provides extensive statistical analysis and summaries.

"Our cash flow has improved because many customers pay upon receiving invoices," Felter said. "We also print and mail statements for outstanding charges at the first of each month."

Felter also said that the company is planning now to expand its system in order to capitalize on a guarantee from Medi Cal that companies transmitting billing electronically will only have a two-week turnaround on cash, down from the present 30- to 45-day wait.

"That's really significant, especially if you're a large biller of Medicare and Medi Cal patients," he said.

This announcement is neither an offer to sell nor a solicitation of an offer to buy these securities. The offer is made only by the Prospectus.

July 13, 1983

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Builder Equipping Homes With Computer Hookups

BENICIA, Calif. — If home buyers are ready for solar technology, then they are also ready for computer technology in their new homes, according to one residential developer.

Southampton Co., developer of Southampton Homes, a 2,450-acre subdivision in this community about 30 miles north of San Francisco, is offering home buyers additional wiring for in-home computer hookups. The developer has also made arrangements for up to \$3,500 to be added to the mortgage for the purchase of a new computer or expansion of already owned systems.

Computer-ready new homes may be a novel idea today, "but five years from now they are going to be the standard," claimed Rod Herman, advertising director for the developer.

Southampton is in its 12th year of developing the subdivision — "about half completed," according to Herman — and plans to equip all future homes with dual telephone hookups and wiring. Herman said Southampton started offering mass-produced solar homes two years ago with standardized active and passive technology; their acceptance by buyers convinced the company that "people are ready to accept the non-conventional."

The obvious next step was computers, he said, and the company learned in conversations with Bay Area computer companies that the most pressing computer-oriented feature needed in a home was an additional phone line. So the company

is installing dual phone lines and running wiring to the family room and to an upstairs bedroom closet that can be converted to a computer room.

Taking the doors off the closet will enable the computer room to expand into the bedroom as a "home office," and the family room can be used for computerized education and entertainment, Herman said.

The new features were first offered in May, and the first homes will be completed late in the summer, Herman said. Seven computer-ready, standard single-family homes and five solar homes have been sold so far.

BRYCE'S LAWS ON INFORMATION SYSTEMS

"No amount of elegant programming or technology will solve a problem if it is improperly specified or understood to begin with."

This is one of the laws embodied in the "PRIDE"-Automated Systems Design Methodology. "PRIDE"-ASDM is an integrated and automated approach for engineering and manufacturing Information Systems. It is a straightforward business approach that is governed by the inherent principles of systems design & development. For more information on "PRIDE"-ASDM and a free poster on "Bryce's Laws", write:



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Theme #5

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E-31 Addressing Computerization Of Health Care

PHILADELPHIA — The American Society for Testing Materials (ASTM) Committee E-31 on Computerized Systems is developing standard guides for the computerization of health care facilities.

ASTM is developing standards for computer use in health care facilities through the work of its Subcommittees E31.07 on Clinical Laboratory Systems and E31.10 on Computerization of the Hospital Pharmacy.

The next meetings of Subcommittee E31.07 and E31.10 will be held in conjunction with the Seventh Annual Symposium on Computer Applications in Medical Care on Oct. 26-27 in Baltimore, Md. Subcommittee E31.10 also will participate in a workshop session at the symposium on Oct. 26.

Further information about the work of Subcommittee E31.07 can be obtained from Robert Megargle, Cleveland State University, Department of Chemistry, Cleveland, Ohio 44115. Information about Subcommittee E31.10 can be obtained from Gloria Cutting, Standard Registration Co., 626 Albany St., Box 1167, Dayton, Ohio 45401.

Information on Committee E-31 and ASTM activities can be obtained from John Rothrock, ASTM Standards Development Division, 1916 Race St., Philadelphia, Pa. 19103.



COMPUTERS MUST CHANGE.

The evolution from vacuum tubes to transistors to microchips has spawned a series of stunning successes for computers—from the mainframe to the mini to the micro. Not since the introduction of the telephone has a piece of equipment made such a positive impact on the workings of business.

Yet, in today's business, a substantial workforce has been largely overlooked by the computer industry: the mobile professional.

They are the executives, salespeople and field-support personnel that spend many of their workdays doing battle against the competition away from their desks—far from the comforts, conveniences and computing aids of the home office.

THE HAZARDS OF THE ROAD.

The mobile professional spends hours on planes, trains and in taxis traveling to business meetings.

Only to have to return at a later date with the typed contract. Or mail in the revised report. Or call back with the final numbers.

Office automation simply hasn't moved fast enough for the mobile professional.

Between paper, pencils, pens, files, triplicate carbon copy order pads, calculators, dictation recorders, appointment diaries, phone books and a picture of the twins, the mobile professional charges off dragging half an office across thousands of miles of territory every year.

SOMETHING, INDEED, MUST CHANGE.

Clearly, what's needed is a viable alternative. A mobile computer designed specifically for the rigors of the road.

Taking the thinking professional's approach, we believe a mobile computer has to be a powerful and complete ultraportable. One that fits easily inside a briefcase. And

runs on rechargeable, self-contained batteries for use en route as well as in the office or at home.

It stands to reason that it must have an adequately large display screen, a full-sized keyboard, a correspondence-quality 8½" x 11" or legal page printer and microfloppy disk drives for memory.

Necessity would also suggest an integrated modem, for two-way data communication via standard telephone lines.

All in a package that weighs in at less than 14 pounds.

THE HARDEST PART IS THE SOFTWARE.

But by far, the most important feature of a truly useful mobile computer is its software. It has to be fully confusion-proof, using familiar graphic symbols, rather than complicated computer-talk, to guide the user through each step.

It also has to offer a full complement of practical application programs, including a personal secretary, word processing and financial planning. Developed precisely for the professional demands of the mobile professional.

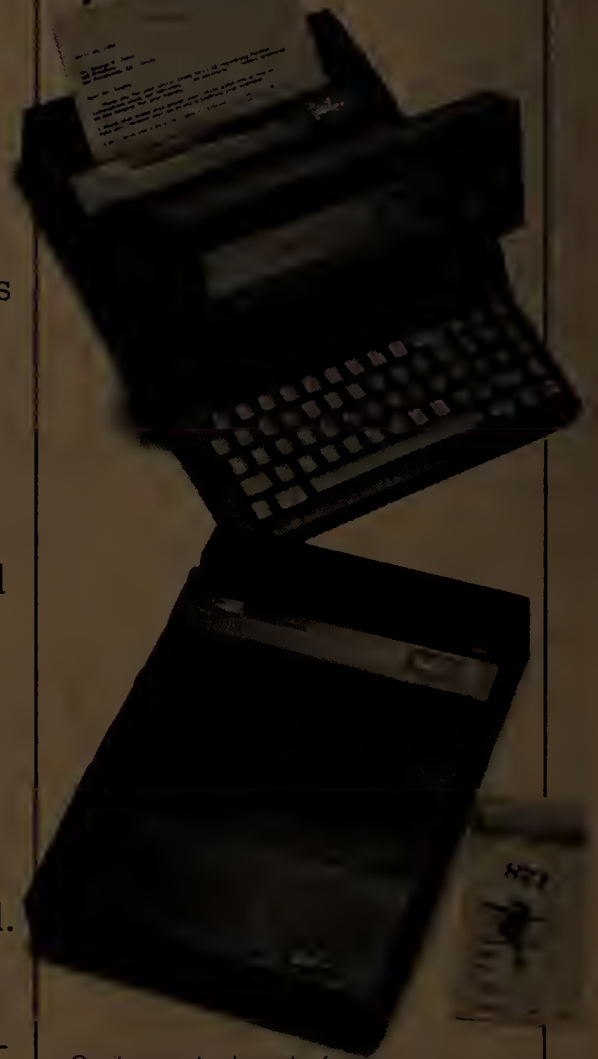
These are the criteria by which we've designed the Gavilan™ mobile computer. In fact, Gavilan

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Could You Be an OA Consultant?

Q I would like to plan for a career as a DP consultant specializing in office automation. I have four years of experience in planning and am currently involved with minis and micros in office automation. What are the rewards and pitfalls for consultants in office automation?

A The demand for good office automation consultants is and will remain high. The problem is that anyone who has ever sold, used or seen an IBM Displaywriter has become a consultant and proclaimed himself an expert in office automation. As a result, the good consultants have a tough time convincing confused buyers of their worth.

An office automation consultant should have a specialized expertise that he can market. The good ones will have an in-depth knowledge of how to integrate existing computer-based systems with the various facets of office automation.

The most difficult problems faced by office automation consultants are not technological. They are computer phobia, the reluctance of secretaries to part with their typewriters, management's resistance to learning keyboarding skills and top management's conviction that office automation does not deserve a high priority. If you have the necessary technological skills and can successfully cope with these attitudes, the rewards are high.

Q I am a 61-year-young anesthesiologist interested in realigning my professional activities away from acute operating room work. This year, out of interest, I have been taking introductory courses in computer science and telecommunications at a local university. I am doing well and am fascinated by the computer field.

Is medical science generally adopting computerization? Is it feasible for me to continue in the study of computer science with the reasonable expectation of being able to obtain employment? How would I pursue these opportunities?

A The application of computer technology to health care and medical science is in its infancy, and progress is slow. Before we move to the next plateau, those in the medical fields, especially physicians, must overcome their reluctance to accept automation and get involved. Your attitude is a breath of fresh air.

The majority of jobs for people with your background and interest would be in medical research or with manufacturers of high-tech medical equipment. Before seeking employment, I would recommend that you continue your program of study and develop a reasonable technical proficiency (at least two years). Be sure to get a good background in microprocessors and hardware interfacing.

The monetary rewards will be less than those of medical practice, but you're going to have fun and perhaps make a significant contribution to health care.

Q Is it too early to gauge the success of the IBM System/34-to-System/38 conversion? Is it truly a difficult conversion?

A The System/38 is a classic example of the *revolutionary*, as opposed to the *evolutionary*, approach to technological innovation. The upward compatibility that has enabled us to switch mainframes and continue processing is sacrificed to achieve the price/performance of the System/38.

Until the recent announcement of the System/36, the System/38 was the logical upgrade from a System/34. Designers of the System/38 therefore wanted to retain certain

characteristics of the System/34. As a result, the two machines are both similar and very different. Their differences, in fact, once prompted one programmer who headed up a conversion effort to remark that she might have been better off if she had not had any System/34 experience.

As to gauging the success of these conversions, those installations with which I am familiar have survived and ultimately expect to thrive in the new environment. However, rather than take full advantage of the features of the System/38, they have elected to work toward the short-term objective of simply getting existing systems up and running. Over the long-term, they hope to exploit the full potential of RPG III and the

Turnaround Time By Larry E. Long

more sophisticated data management capabilities.

Long, president of Long and Associates, is a consultant, lecturer and author in the field of information services. If you have a question you'd like him to address, send it to Larry Long, Editorial Department, Computerworld, P.O. Box 880, Framingham, Mass. 01701.

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Utilities Help End Users Help Themselves

CHICAGO — The small size of its DP department did not prove to be a handicap for a maker of packaging products, inks and chemicals here once utilities were installed to help end users write their own reports and retrieve their own information.

The DP department at Handschy Industries, Inc. previously was very centralized; a staff of three owned all knowledge of the business application systems developed through the years on an IBM System/3. Batch systems later were converted to an IBM System/38 that was utilized "essentially as a larger System/3," according to Michael T. Donovan, manager of management information systems (MIS).

"The users' expectations for the new System/38 were far beyond the current software system's capability," Donovan recalled. "Information was being requested that could not be provided. In addition, the number of requests were far greater than the resources of the meager department."

Developing a Plan

Donovan was hired last fall "to get the IBM under control," he said. He soon discovered that users depended on the MIS department for all their needs, but no scheduling, planning or department standards existed. Donovan developed a plan that included:

- Getting operations under control by scheduling activities.
- Developing a structured MIS organization.
- Developing short- and long-term plans to achieve the corporation's decentralized DP goals.
- Acquiring software systems and utility products to allow the users access to the data base.

In order to get the current applications to the users, the new staff began making minor modifications to the current systems that allowed the users to be responsible for their applications. The project included educating users in the concepts of the new systems.

"We soon discovered that the users, with their new knowledge of the system, were requesting services from our data center more than ever before," Donovan said. "Our programming resources could not provide the service within the short time it was required."

The department evaluated three software products designed to allow nontechnical users access to the data base. One was rejected because it was not user-friendly

enough and would require greater hardware resources than the others. The second, a report writer, was rejected because it was still under development at the time of the targeted installation.

The department selected the MRC-Query series from Michaels, Ross & Cole Ltd. of Oak Brook, Ill. The series centers around MRC-Retriever, a utility product that allows users to develop in-

terpretively their own on-line inquiries, and MRS-Reporter, a report generator.

"Application users found that computer phobia was no longer a problem because the MRC-Retriever was easy to use. They were able to extract information without the assistance of the data center," Donovan said.

The technical staff realized benefits through the use of MRC-Retriever as well,

Donovan said. The product helped them improve their familiarity with the current data base, locate data base inconsistencies, reduce programming time for user requests and reduce the time needed to track and correct program malfunctions.

Through the user reeducation program, communication between users and technical people was improved as well. "We have achieved a

large degree of success in regaining control in the daily operations," Donovan said. "We have been able to program the solutions to the real problems and not just symptoms."

"In fact, the MRC-Retriever and Reporter have cut project costs and schedule times by eliminating inquiry and report programs that previously had to be written by programmers."

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Australian Computer Society Sets Sept. Conference

MELBOURNE, Australia — The Tenth Australian Computer Conference will be held at the Royal Exhibition Building here Sept. 26-30.

Billed as the major event in the Australian Computer Society's (ACS) 1983 calendar, this is the first time the event will be held on an annual basis after running bi-annually since 1966.

Registration fees are \$210 for ACS members, \$250 for nonmembers and \$100 for students; a \$30 late fee is required with registrations received after July 31. More information is available by writing to 10 ACC Registration, P.O. Box 29, Parkville, Victoria, Australia 3052.

Scheduled to Begin Sept. 26

Conference on IBM Systems Slated

FRAMINGHAM, Mass. — MIS Training Institute, Inc.'s Third Annual Conference on Control, Audit and Security of IBM Systems will be held at the Grand Hyatt Hotel Sept. 26-29.

Full-day tutorials on security and audit issues scheduled the first day are: "MVS," Keith R. Soper, management consultant; "CICS/VS," Jeffrey Katz, senior con-

sultant to Teltech, Inc.; "DOS/VSE," Eugene Katz, management consultant; "IMS," Michael Salvberg, principal of the Pragman Group; and "Non-IBM Data Base Management Systems," Michael Stoneham, of Coopers and Lybrand.

Concurrent technical sessions on Tuesday through Thursday will cover topics such as "SQL/DS," "SMF,"

"SAS," "ASF-2," "RACF," "Top Secret," "SPF," "Vsam," "Packet Switching," "Systems Network Architecture/Synchronous Data Link Control," "System/38" and the "IBM Personal Computer."

The conference fee is \$595. More information is available from MIS Training Institute, 4 Brewster Road, Framingham, Mass. 01701.

Firms Offer Seminars On Networks

SUDBURY, Mass. — Technology Concepts, Inc., in cooperation with Digital Equipment Corp., is offering a series of seminars on networking that is available on color video cassettes.

According to Technology Concepts, the 12-cassette series is not product-specific and provides information on planning, creating and implementing networking strategies within organizations for project managers, design or software engineers, network planners, systems analysts and communications consultants.

Available as a package or individually, the 12 cassettes total 10½ hours of instruction. The package, including a 385-page reference book, costs \$4,400; and the individual tapes cost \$400 each. Additional reference books cost \$25 each.

A special 15-min preview videotape is available for \$50, which can be applied toward the purchase price of the seminar package. More information about the series is available from Technology Concepts, 730 Boston Post Road, Sudbury, Mass. 01776.

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Calendar

Week of August 14

Aug. 15-19, Denver — **Contemporary Computer Auditing — Integrity Controls.** Contact: Marge Umlor, EDP Auditors Foundation, 373 S. Schmale Road, Carol Stream, Ill. 60187.

Aug. 15-19, Springfield, Mass. — **CICS Command Level Programming Workshop.** Contact: Keith Lamb, New England Data Services, Suite 4, 1353 Boston Post Road, Madison, Conn. 06443.

Aug. 15-19, Sunnyvale, Calif. — **Network Performance Management.** Contact: The Institute for Software Engineering, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

Aug. 15-19, Atlantic City, N.J. — **How to Develop an Effective Long-**

Range Data Processing Plan. Contact: Keston Associates, 11317 Old Club Road, Rockville, Md. 20852. Also being held Aug. 22-26.

Aug. 15-19, Fort Lee, N.J. — **CICS/VS Internals.** Contact: Dianne Halper, On-Line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024. Also being held in Los Angeles.

Aug. 15-19, Santa Cruz, Calif. — **Computer System Performance Evaluation.** Contact: Institute of Computer Science, University of California Extension, Santa Cruz, Calif. 95064.

Aug. 16-18, Washington, D.C. — **Data Communications Networks Design and Optimization.** Contact: Registrar, Institute for Advanced

Technology, 6003 Executive Blvd., Rockville, Md. 20852.

Aug. 16-19, Reno, Nev. — **Data Communications: Components, Systems and Networks.** Contact: Registrar, Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

Aug. 17-18, San Francisco — **Guidelines for Successful Selection, Acquisition and Operation of Microcomputer and Minicomputer Systems.** Contact: Structured Methods, Inc., 7 W. 18th St., New York, N.Y. 10011.

Aug. 17-19, Washington, D.C. — **Structured Analysis and Design.** Contact: Registrar, Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

Aug. 17-19, Arlington, Va. — **SAS Processing Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

Aug. 18-19, New York — **IMS/ Data Communications Applications Programming.** Contact: Rosa DiSanto, Comped Technical Corp., 1133 Ave. of the Americas, New York, N.Y. 10036.

Aug. 18-19, New York — **International Marketing.** Contact: The Association of Data Processing Service Organizations, 1300 N. 17th St., Arlington, Va. 22209.

Aug. 19, New York — **Basic Programming for Business Applications.** Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 Seventh Ave., New York, N.Y. 10123. Also being held Aug. 26.

Week of August 21

Aug. 22, Worcester, Mass. — **The Revolution in Telecommunications Technologies.** Contact: Ginny Bazarian, Office of Continuing Education, Worcester Polytechnic Institute, Worcester, Mass. 01609. Also being held Aug. 23 in New York.

Aug. 22, Clinton, Md. — **Personal Business Computers for Financial Decision Making.** Contact: Phyllis W. Parrish, Center for Management Development, Business and Management, University of Maryland, College Park, Md. 20742. Also being held Aug. 23 and 24.

Aug. 22-23, Nashua, N.H. — **How to Plan and Implement a Word Processing System.** Contact: New Hampshire Resource Center, New Hampshire College, 2500 N. River Road, Manchester, N.H. 03104.

Aug. 22-24, St. Louis — **The Fifth Annual Satellite Communications Users' Conference.** Contact: Cheryl Carpinello, Satellite Communications Users' Conference '83, Satellite Communications Magazine, 6430 S. Yosemite St., Englewood, Colo. 80111.

Aug. 22-24, Parsippany, N.J. — **Vsam in Cobol.** Contact: Chubb Advanced Training Center, 480 Morris Ave., Summit, N.J. 07901.

Aug. 22-25, Minneapolis, Minn. — **Data Base Administration and Control Workshop.** Contact: Registrar, Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

Aug. 22-25, Piscataway, N.J. — **CICS/VS Testing and Debugging.** Contact: Rosa DiSanto, Comped Technical Corp., 1133 Ave. of the Americas, New York, N.Y. 10036.

Aug. 22-25, Los Angeles — **CICS/VS Logic and Debugging.** Contact: Dianne Halper, On-Line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

Aug. 22-26, Englewood Cliffs, N.J. — **System Resource Planning and Selection.** Contact: The Institute for Software Engineering, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

Aug. 22-26, New York — **Vsam File Management and Programming.** Contact: Rosa DiSanto, Comped Technical Corp., 1133 Avenue of the Americas, New York, N.Y. 10036.

Aug. 22-26, Fort Lee, N.J. — **CICS/VS Application Programming**

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Calendar

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Aug. 22-26, Washington, D.C. — **Computer Performance Measurement and Capacity Planning.** Contact: Registrar, Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

Aug. 22-26, Chicago — **Structured Analysis Workshop.** Contact: Structured Methods, Inc., 7 W. 18th St., New York, N.Y. 10011.

Aug. 22-26, Santa Cruz, Calif. — **Data Modeling and Data Base Concepts.** Contact: Institute in Computer Science, University of California Extension, Santa Cruz, Calif. 95064.

Aug. 22-26, Santa Clara, Calif. — **Open Systems Interconnection Architecture and Protocols for Distributed Information Systems.** Contact: Omnicom, Inc., Suite 206, 501 Church St. N.E., Vienna, Va. 22180.

Aug. 22-26, Washington, D.C. — **The National Conference on Artificial Intelligence.** Contact: The American Association for Artificial Intelligence, 445 Burgess Drive, Menlo Park, Calif. 94025.

Aug. 22-26, New York — **Structured Design Workshop.** Contact: Structured Methods, Inc., 7 W. 18th St., New York, N.Y. 10011.

Aug. 23, New York — **Introduction to DBase II.** Contact: Center for Advanced Data Processing, 450 Seventh Ave., New York, N.Y. 10123. Also being held Aug. 25.

Aug. 23-24, San Jose, Calif. — **Comtech '83.** Contact: Lucy Lopez, Comtech Data Corp., Suite 242, 2700 Augtine Drive, Santa Clara, Calif. 95051.

Aug. 23-25, Hartford, Conn. — **Advanced CICS Command Level Workshop.** Contact: New England Data Services, P.O. Box 92, Guilford, Conn. 06437.

Aug. 23-25, Atlanta — **Structured Systems Planning.** Contact: Georganna Carson, Ken Orr and Associates, Inc., 1725 Gage Blvd., Topeka, Kan. 66604.

Aug. 23-26, Bellaire, Mich. — **1983 International Conference on Parallel Processing.** Contact: Institute of Electrical and Electronics Engineers Computer Society, P.O. Box 639, Silver Spring, Md. 20901.

Aug. 24-25, Cary, N.C. — **SAS Color Graphics Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

Aug. 24-26, St. Louis — **Introduction to Vsam for Systems Programmers.** Contact: Center for the Study of Data Processing, Campus Box 1141, Washington University, St. Louis, Mo. 63130.

Aug. 24-26, New York — **Data Base Management Systems: A Comparative Analysis of General Purpose Systems.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Aug. 24-26, Denver — **Structured Analysis and Design.** Contact: Registrar, Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

Aug. 24-26, Pittsburgh, Pa. — **Systems Design for the '80s.** Contact: Brandon Systems Institute, 4720 Montgomery Lane, Bethesda, Md. 20814.

Aug. 24-26, Dallas — **SAS Processing Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

Aug. 24-26, New York — **Fundamentals of Data Processing.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Aug. 25, New York — **Word Processing on the IBM Personal Computer.** Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

Aug. 25, San Francisco — **IBM Personal Computer Market and Technology Day.** Contact: Seminar Sales, Future Computing, Inc., 900 Canyon Creek Center, Richardson, Texas 75080.

Aug. 25-26, Clinton, Md. — **How to Use a Personal Business Comput-**

er for Professional Tax Preparation. Contact: Phyllis W. Parrish, Center for Management Development College of Business and Management, University of Maryland, College Park, Md. 20742.

Aug. 26-28, Woodside, Calif. — **IBM Personal Computer Faire.** Contact: Jim Warren, IBM Personal Computer Faire, 345 Swett Road, Woodside, Calif. 94062.

Aug. 27, New York — **Introduction to the IBM Personal Computer.** Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 Seventh Ave., New York, New York 10123.

Week of August 28

Aug. 29-31, Parsippany, N.J. —

Data Processing for the Non-DP Executive. Contact: Chubb Advanced Training Center, 480 Morris Avenue, Summit, N.J. 07901.

Aug. 29-Sept. 1, Fort Lee, N.J. — **CICS/VS Application Design.** Contact: Dianne Halper, On-Line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

Aug. 29-Sept. 1, New York — **Vsam: Its Structure and How to Use It.** Contact: Dianne Halper, On-Line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

Aug. 29-Sept. 2, New York — **Structured Analysis Workshop.** Contact: Structured Methods, Inc., 7 W. 18th St., New York, N.Y. 10011.

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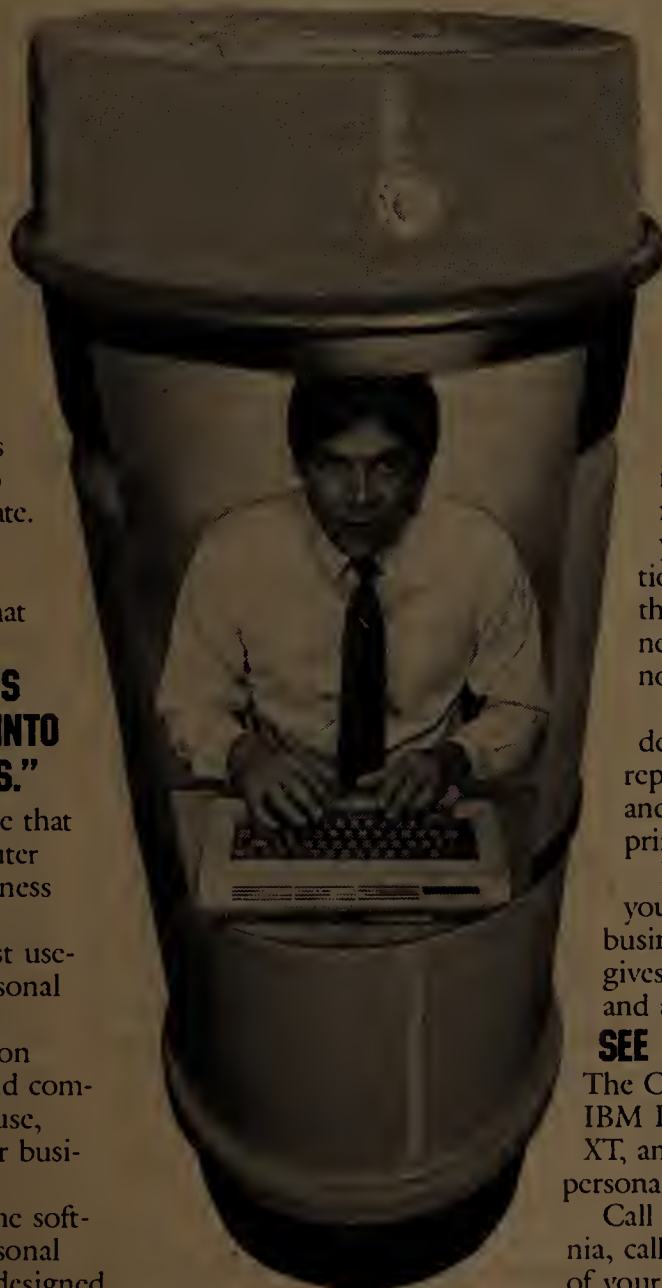
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EDITORIAL

Getting the Word Out

Different divisions of the same company recently took radically different tacks when it came to letting corporate end users know they had set up information centers.

United Technologies Corp.'s Sikorsky Aircraft Division in Stratford, Conn., trumpeted the birth of its information center by sending staff members to the far reaches of the division to get the word out to end users. But when United Technologies' Hamilton-Standard Division in Windsor Locks, Conn., set up its information center [CW, July 18], a concerted effort was made to stifle publicity.

Concerned about both the drain on CPU resources and the amount of work that would be caused by a flood of end-user computing, Hamilton-Standard to this day has made no formal announcement of the information center's existence.

Sikorsky Aircraft's method of announcing the information center's existence — along with its practice of training interns from different departments for a month in the center and then returning them to their departments as resident experts — serves as a statement to DPs and non-DPs alike that the information center is an integral part of the corporation, available to everyone.

By staying tight-lipped, Hamilton-Standard may well have sacrificed some of the necessary moral and financial support it will need to maintain its information center. Moreover, its secretiveness may serve only to reinforce the perception that DP is a mystical process available only to a select few. We have learned the hard way that that perception only cripples the DP department.

Ironically, in both cases, the information centers have been mobbed by end users seeking support, assistance and education for using application software tools to develop their own applications and do their own maintenance. Hamilton-Standard's secrecy proved an exercise in futility.

DP executives planning to start an information center are advised to examine carefully the likely repercussions of the approach they choose to inform end users of the center's existence. If maintaining a low profile is your first priority, consider what you may sacrifice.

DATA PAST

Five Years Ago July 24, 1978

WASHINGTON, D.C. — Then-President Jimmy Carter reacted to the sentencing of Soviet computer scientist Anatole Sharansky to 13 years in prison and labor camps by canceling the sale of a \$6.8 million computer system to the USSR. Carter's nixing of the proposed sale of the Sperry Univac 1100 series system to Tass, the Soviet news agency, was one of several moves to express U.S. condemnation of Sharansky's trial and conviction on charges of treason and anti-Soviet agitation.

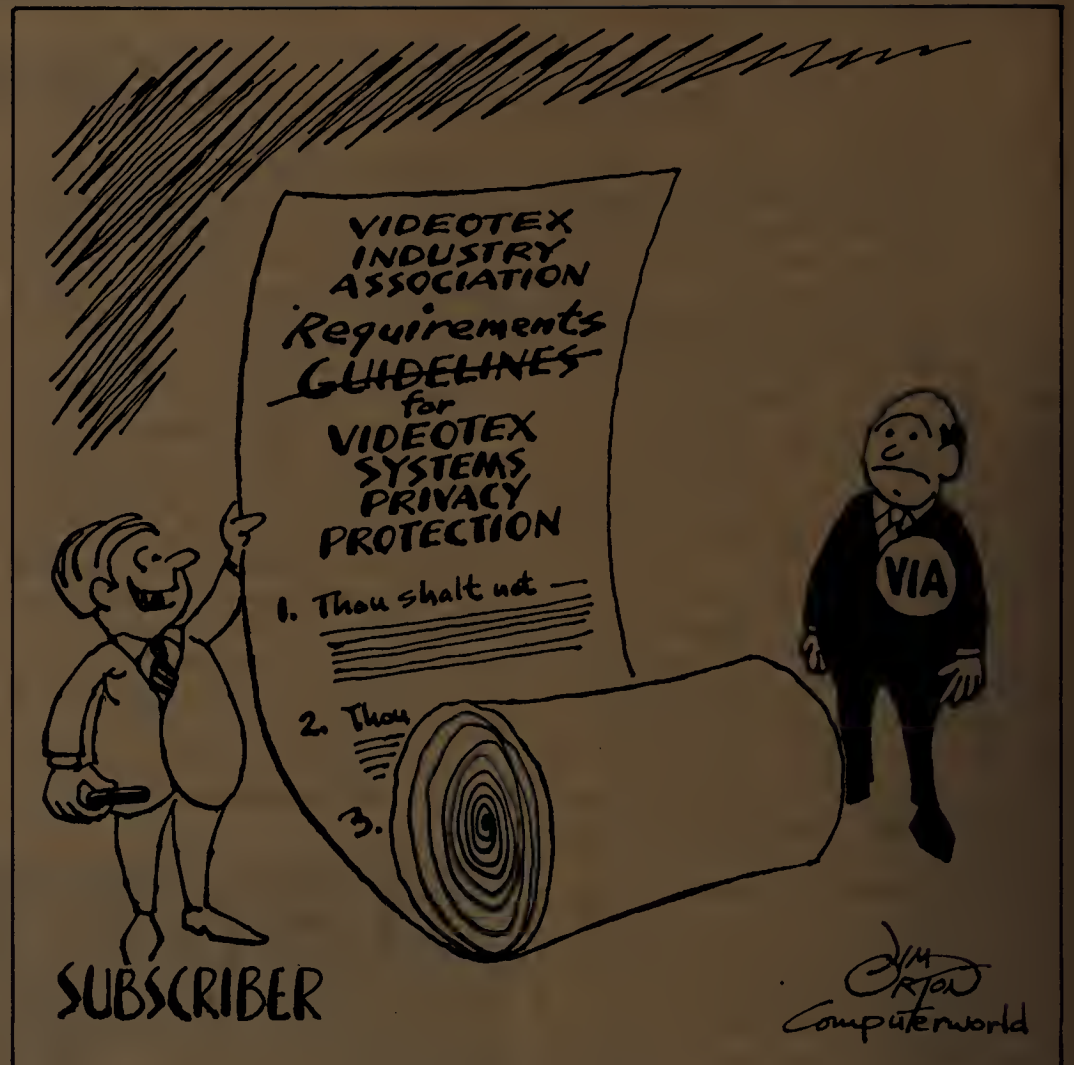
Ten Years Ago July 25, 1973

WHITE PLAINS, N.Y. — IBM began offering virtual storage users a double-density 3330 disk storage subsystem. The firm doubled the number of cylinders per disk pack and used different read/write heads and associated electronics to produce this system.

DETROIT — Burroughs Corp. moved to provide an easy growth path for its B1700 users by enlarging basic central processor components and adding new peripherals.

WASHINGTON, D.C. — AT&T filed a petition asking the Federal Communications Commission to issue a declaratory ruling that would clear the way for Bell to file a tariff and allow it to offer its Advanced Communications Service as a regulated service.

WASHINGTON, D.C. — A Federal Highway Administration report stated that car pooling for employees of large firms is best done by computer and that the number of cars being driven to work could be halved.



'Excellent — as Amended.'

LETTERS

Definitions of 'Erasure'

I have read with interest Robert H. Courtney Jr.'s letter to the editor [CW, May 30] and the rebuttal given in J. Michael Nye's letter to the editor [CW, June 20]. One of the issues raised in the letters regarding the security of erasing magnetic data storage media will undoubtedly confuse many users of ADP systems to the detriment of our industry.

The term "erasure" of magnetic media means different things in the two letters. In practice, there are several definitions commonly used:

1. To mark a previously used data area as erased (or deleted) and available for subsequent data storage.
2. To reduce the data signal level below that required for reliable reading on typical ADP equipment.
3. To reduce the signal level to a point where it cannot be read with commercially available magnetic data recovery equipment.
4. To reduce the signal level to a point where it cannot be read with specialized signal enhancement equipment within a specialized laboratory.

Definition 1 is often used by word processing and personal computer users when erasing or deleting data files. In many such systems, an entry in the data file directory is changed to show that the space is available for future use. No actual magnetic erasure is done.

Definition 2 refers to someone erasing magnetic material accidentally, for example, with a small magnet, so that errors are signaled by the ADP equipment. This is possible only if the magnetic media comes within close proximity of the magnet (for example, within 3 inches of a powerful permanent magnet). ADP equipment read errors generally occur when the nominal data signal level drops to one-third original val-

ue; a small magnet touching the jacket of a floppy disk can reduce the data signal level to 1/500 original value.

Definition 3 is used by commercial organizations that degauss (that is, demagnetize or bulk erase) their magnetic media before rerecording them with new data and sending the media to other organizations. If properly used, such erasing equipment will reduce the signal level to 1/10,000 nominal value.

Definition 4 is used by government organizations when establishing policy and procedures for destroying magnetic media that has been used for classified data rather than releasing the media for nonclassified and uncontrolled applications. Technical specifications supporting such policies are not publicly available.

Nye uses Definition 1 in his letter, while Courtney uses Definition 4.

Most commercial ADP users are interested in Definitions 2 and 3 when establishing security procedures. A recent publication — "Care and Handling of Computer Magnetic Storage Media," Sidney Geller, NBS Special Publication 500-101, U.S. Government Printing Office, SN 003-003-02486-4 — produced by the Institute for Computer Sciences and Technology, discusses the practical issues regarding accidental and intentional erasure of magnetic materials.

While arguments among blindmen "looking at" isolated parts of an elephant are amusing, ADP magnetic media users (from home hobbyists to intelligence community technicians) should see the entire elephant and use the proper security solution for their particular problems.

Dennis K. Branstad
Computer Security Technology
National Bureau of Standards
Washington, D.C.

LECHT ON SCIENCE /Charles P. Lecht

Herman Kahn, Future Man

Herman Kahn was incredibly interested in computers and extremely capable of making them work. He was of that first generation of scientists to whom our modern forms of stored program, digital computers were available to aid in research and whose interest in them was focused upon what could be accomplished through their use rather than upon how they could be made. As such, his death on July 7, at the age of 61, signaled the end of an era — the first in which scientists could spend their entire working careers utilizing computer systems and directly benefiting from their powers.

Kahn was, in fact, one of the world's first programmers; he may have been the only one who still knew how to program, and regularly did so, some 38 years later. He surrounded himself with computing devices from his earliest days at Rand Corp. in 1948, and thereafter, having left Rand to form the prestigious Hudson Institute in 1961, until his death. He loved the things that could be done with computers and used them in such a matter-of-fact way that one wonders whether he ever actually needed to "learn" programming; he was a natural.

It's hard to think of a scientific discipline to which Kahn had not addressed his energies at least once, using his computer of the moment in the quest for meaningful results. At times, one had the impression that Kahn was a free-floating answer ever in search of a new question. Ultimately, he took on the most pressing

'Kahn was, in fact, one of the world's first programmers; he may have been the only one who still knew how to program, and regularly did so, some 38 years later . . . He loved the things that could be done with computers and used them in such a matter-of-fact way that one wonders whether he ever actually needed to "learn" programming; he was a natural . . . He never worried about being taken over by computers; he was always one step ahead of everyone's latest program.'

question of his time: Does nuclear warfare make sense — really, does it?

In his book *On Thermonuclear War* (1960), he, armed with an IBM 7090/4, attacked the problem of our chances for survival using various t=0 scenarios and in so doing, provided a computational service of such consequence to mankind that, should we ever find a solution to the enigma of massive weapons creation, he, with his computer genius, must be credited with having raised our global consciousness to a level that made its discovery possible.

Saying the unsayable in his book *Thinking About the Unthinkable* (1962), he challenged us all when he called upon conventional statistical theory to ask his computer what the effects of a nuclear "first strike" would be, regardless of by whom it was launched, on America's chances for survival.

From this, the concept of "kill ratio" emerged — the number of us to the number of them — and with it,

the outraged cries of millions of people everywhere, imploring, demanding of our leaders that they find some other way.

He ran the risk, quickly realized in the public mind, of standing accused of murder for having discovered and given expression to the actual results of a nuclear warfare he did not invent. Because he relayed the appalling facts with aplomb and occasional sardonic humor, he found himself charged by the ignorant, as perhaps by those whom his awful message deranged, with favoring nuclear warfare as a tenable instrument of foreign policy. And so Kahn suffered the indignity of having his many warnings interpreted as blackmail rather than seen for the urgent and compassionate revelations they truly were.

No one was more horrified at the prospects of nuclear war than this man who had the temerity to confront us with hard quantifications of our collective, if as yet not fully real-

ized, madness.

Yet through it all, Kahn remained an unbridled optimist; indeed, there may never have been a greater. For him, a ruined economy established the basis for *The Coming Boom*, his last major work (1982). A despondent fellow human being provided an occasion for kindness. Kill-ratio statistics were stark pointers to reason in the avoidance of war while there was yet time. Kahn loved people, especially his family, more than anything on Earth, save, perhaps, his country, and wanted to see them survive.

He never worried about being taken over by computers; he was always one step ahead of everyone's latest program. He welcomed the latest computer with the same sense of ceremony as you would a new Porsche, and with as much pleasure. Kahn sat at the center of a galaxy of computers, from the simplest to the most sophisticated, manipulating them with joy and eliciting from them the best of what they had to offer to the proof — or disproof — of his theories. Kahn believed that as airplanes gave wings to the scientist's body, computers gave wings to his mind. He loved to fly both. With his passing, an irreplaceable exuberance, hopefulness and genius vanish from the scene in general — and from our computer scene, where dullness is usually taken for high seriousness, in particular.

Lecht is president of Lecht Sciences, Inc., a New York-based think tank specializing in computer and communications technologies.

HUMAN CONNECTION/Jack Stone†

Big Board Serves as Model for DP Security

"Nabbed 'em!" the media exclaimed when they recently reported the striking DP successes of the New York Stock Exchange (NYSE) in bringing some very clever stock manipulators to justice.

In the noble tradition of Elliot Ness and Sherlock Holmes, sleuths at the NYSE, ably led by Charles G. Ehrhard of the Market Surveillance Services and correlating closely with computing cohorts, snared the wily band of conspirators who were proven guilty of flagrant insider trading, a rip-off scheme in which confidential information is used illegally to make a bundle off stock trading. Hats off to the DPs there for their biggest break since the system was installed.

Although their application is unique, the depth of surveillance monitoring they apply serves as a classic model for what should be happening in every large DP center today and, as everyone knows, is not.

Some Highlights

I thought it might be useful to run through some of the highlights of the NYSE applications strategy, the purpose being to illustrate the thoroughness that is required to maintain and to control illegal manipulation

'Through the assistance of computer machinery, much of the analysis can take place within a very short period of time, certainly quickly enough to assign a member of the exchange to monitor current transaction flows of suspected stocks and stop trading in them if price and volume spreads seem to be getting out of hand.'

of data records.

Base-level screening is performed by establishing running averages of price and volume ranges for particular stocks and then employing computerized monitoring of actual spreads on a daily basis. Stocks that move out of their average ranges are flagged for review by the surveillance team.

Next in line is an inquiry system that accesses a file of recent transactions in the stock.

By examining a short-range history of such movement in a particular stock, the experienced surveillance analyst can determine the degree to which floor traders are making a market in the stock, that is, handling successive trades in such a way that the price levels do not unreasonably fluctuate.

Most of the trading excesses that are noted can be attributed to input data errors emanating from the trading floor and are quickly resolved; those few that are not resolved must be examined in more detail to determine a rational (legal) explanation for the stock behavior.

Unusual Activity

The analyst need turn only to his all-purpose data base of business news, broker releases, trade analyses and sundry industry data for information that could influence trading in the stock and explain away unusual trading activity. As investors know, market activity is highly susceptible to such information (plus rumors, tips and astrological forecasts), and its genesis can usually be identified in a hurry. This process elimi-

nates all but a handful of stocks, which are garnered for in-depth monitoring.

The amazing part of all this is that through the assistance of computer machinery, much of the analysis can take place within a very short period of time, certainly quickly enough to assign a member of the exchange to monitor current transaction flows of suspected stocks and stop trading in them if price and volume spreads seem to be getting out of hand.

Meanwhile, back at surveillance headquarters, a couple of keystrokes produce a hard copy of daily trading statistics for a suspect stock over any specified period. A few more control keys bring forth the detail on each transaction, including names of the two brokerage houses involved in the trades, stock volume and time of transaction.

With information of this quality available at one's fingertips, the detective process becomes more properly cerebral and less drudge. The conclusion is clear: Those running afoul of the law will find it tough to compete with computerized systems cut from the same cloth as NYSE's.

Letters to Stone should be addressed to him at Box 270, 1377 K St. N.W., Washington, D.C. 20005.

READER COMMENTARY/Russell Hoffman†

Keep Some Trainees on Staff at All Times

The need for bringing new entrants into the field of computer programming is recognized throughout the industry as shortages of qualified personnel continue. Unfortunately, a large number of companies consider it to be someone else's job to hire trainees and as a result, they do little to alleviate the problem. This is a most unfortunate attitude for the industry as a whole, and it can be detrimental to the companies that carry out such a policy.

Entry-level programmers, if reasonably well picked, can be shown to be well worth the investment. Some of the advantages of keeping a cer-

tain percentage of trainees on the staff at all times are:

- *Trainees can be paid far less than seasoned professionals.* Often one can hire two or three trainees for the price of one professional. Few shops lack simple applications for these employees to work on, programs that need documentation updated and a backlog of small maintenance projects.

- *Trainees can be trained to the specific style the DP shop prefers.* While in school, they usually have been exposed to different styles of programming, creation of data names, methodology of flowcharting and so on.

Beginning programmers can generally be shown to be more willing and able to follow a shop's standards than older, more set employees.

- *Trainees can be given tasks over which other employees would quit.* Few shops lack the need for programmers to do dudgery tasks such as changing file descriptions and recompiling all relevant programs or converting an entire software system to run on a new hardware configuration. In the latter case, a skilled programmer may need just as much training to perform the task as a new one, in part, perhaps, due to a reluctance to take on such a task in the first place, a task

that could be a valuable and challenging experience to the beginning programmer.

- *Trainees allow a manager to find the ace programmers.* A good programmer may be as much as 25 times more efficient than a bad one, considering all phases of the programming cycle — designing, coding, testing and future maintenance. In most shops, a relatively small percentage of the programmers do most of the hard work, with perhaps 20% doing as much as 50% to 70% of the projects. While few of these superprogrammers are entry level, many of them have relatively few years in the business. If those years were obtained at the same shop on the same basic applications, the superprogrammer could surface much sooner by being totally acclimated to the specific DP environment.

- *Trainees permit better utilization of experienced programmer's time.* In addition to helping to retain good, older employees by having trainees take on the less challenging tasks, hiring trainees allows the manager to dole out only complex and involved tasks to experienced staff, thus utilizing their time better and providing greater potential for job satisfaction.

- *Trainees provide for a clearer seniority profile and pay scale.* Ideally, if all employees start as trainees within the shop, seniority is based on job performance rather than on past employer's pay scales. By having a number of trainees, the dull tasks can be shifted as the trainees climb in seniority, giving a shop a group of versatile employees, none of whom had to spend an exceedingly long time on any one dull task.

- *Trainees can be hired from other company departments.* This permits a deeper understanding of the relevant input-process-output cycles of the various departments in a company and provides a basis for accelerated growth of these employees into management and systems analyst positions.

- *Training trainees is a task some senior programmers are sure to relish.* Training trainees does not have to be a large portion of the senior person's routine. Assigning reading, reviewing code and suggesting testing techniques can take very little time, but be a very satisfying diversion from regular duties.

What we have then is a large number of compelling reasons to hire trainees. They can be useful additions to a staff in terms of morale, efficiency and, most importantly, budget considerations. There are very few companies in which most of these arguments cannot be applied.

Hoffman is a Cobol and BAL instructor at a programming school.

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Smooth Transition

Bank's Packages Handle Growth, Merger

NASHVILLE, Tenn. — When a savings and loan association here was formed from the merger of three separate banking firms, several systems and utility software packages helped smooth the transition period.

Metropolitan Federal Savings and Loan was created in 1981 with the mergers of the Nashville-based Home Federal Savings and Loan, First Federal Savings and Loan and First Franklin Savings and Loan. With 250 employees and 20 branches, Metropolitan has approximately \$800 million in assets.

Dave Emerson, DP manager for the firm, said the data processing installation was established four and a half years ago with an IBM 370/135 to service two of the original savings and loans.

"Our policy is not to modify our packages unless absolutely necessary," Emerson said. To comply with this, the firm acquired Pansophic Systems, Inc.'s Easytrieve information retrieval and data management system to provide reports to its users. Metropolitan was processing three separate associations on its system at



Dave Emerson

that time. "There were duplications of account numbers and records, and we used Easytrieve to identify the duplications so that we could renumber our accounts where necessary," he noted.

About a year ago, Metropolitan acquired another savings and loan. At the

same time, the firm installed Pansophic's Pro/Grammar, an applications development and retrieval system. "When we used Pro/Grammar on the acquisition, it was used to do some of our file conversions," Emerson said.

The growth of the savings and loan prompted further changes in the DP center at Metropolitan, Emerson explained. "In the third quarter of last year, due to the merger, acquisitions and growth, the IBM 370/135 became overloaded. Therefore, we determined that additional processing capability was required and located an IBM 370/158. We also elected to go from a one-computer shop to a two-computer shop." The firm purchased Pansophic's Panexec program management and control system to help with the control aspects of a two-computer operation.

"Panexec was valuable in the upgrade and installation. It enabled us to meet our schedule. That was imperative because we had a new service that was being offered to the public by a certain date," Emerson said.

When Metropolitan first was formed, its program maintenance was handled strictly through cards. Emerson explained that the firm installed Pansophic's Panvalet source program management and security system. Metropolitan also installed IBM's CICS so it could run Pansophic's Panvalet/On-Line. The on-line system essentially was an independent monitor for the servicing of the savings and loan. "We then undertook a conversion of our on-line package to CICS," he said. "We start-

(Continued on Page 52)

Package Ties IBM Microcomputer To VM/CMS-Based Mainframes

NEW YORK — VM Personal Computing, Inc. has introduced a package designed to facilitate uploading and downloading of text or data files between the IBM Personal Computer and any IBM or plug-compatible VM/CMS mainframe system.

Called Please, the package is said to run on all VM/CMS-based mainframes. It is intended to be used in conjunction with IBM Personal Computers running VM Personal Computing's Relay communications software packages. Please reportedly allows uploading and downloading of any format data over normal asynchronous telephone lines with error detection and correction in both directions.

According to the vendor, Please can accommodate text or data files of any length or format and ensure accurate transmission of all files even if they include control characters or binary data. Please is designed to handle character translations

between the IBM Personal Computer and the mainframe.

The Please-Relay interface is said to allow users to:

(Continued on Page 50)

Cincom Offers Development Aid

CINCINNATI — Cincom Systems, Inc. has introduced an on-line application development and operation aid for IBM OS and DOS operating systems.

Called Series 80 Entire, the tool uses the reentrant program architecture of Cincom's Series 80 Environ/1 teleprocessing monitor and includes four integrated components:

- A security management system protects applications from unauthorized access.
- An on-line printer support system provides protection and control facilities

for printed reports.

- Network utility services are included for monitoring and controlling the terminal network.

- A programmer support system provides a standardized approach to on-line system implementation.

The purchase price on an OS or DOS system is \$15,000, according to a vendor spokesman. Lease price is \$625. The usage fee is \$1,650 and installation costs \$2,000. The software is available from Cincom at 2300 Montana Ave., Cincinnati, Ohio 45211.

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Datapro had this to say about KOMAND: "If you are in the market for an efficient and flexible job accounting system for your OS or OS/VS system, you should take the time to evaluate KOMAND... after all, these users judged it good enough to be placed in the highest cluster category for overall satisfaction."

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SOFTWARE & SERVICES

'CA-Sentinel' Handles DOS/VS(E) Security

JERICHO, N.Y. — Computer Associates International, Inc. has announced CA-Sentinel, a data security system for on-line and batch processing in IBM DOS/VS(E) environments.

CA-Sentinel may be controlled and maintained on-line using either IBM's CICS/VS, CMS or ICCF. Among the resources that can be protected are transactions, programs, files, records, transient data and tem-

porary storage. The system extends protection into batch partitions for programs, data files and DOS/VS(E) system libraries.

Package options permit real-time notification of access violations, a spokesman said. The user has the option to suspend processing at terminals or in partitions if severe violations are detected. All violations and unsuccessful logon attempts are recorded in a log file available for on-line query and reporting. Passwords carry expiration dates, and new passwords can be automatically assigned.

CA-Sentinel is priced at \$10,000 for a three-year lease from 125 Jericho Tnpk., Jericho, N.Y. 11753.

'Vnat' Tool Gets Updated Version

AURORA, Colo. — MB & Associates has announced a new version of its Vsam/Natural (Vnat) interface utility program, said to provide increased performance and flexibility and full user security.

Vnat is a utility program for IBM's OS and DOS operating systems that allows users of Software AG of North America, Inc.'s Natural to access IBM Vsam files in their Natural programs and simultaneously to bridge Vsam and Software AG's Adabas in the same Natural program.

Version 2.1 features include backward file positioning, enhanced browse capability, quicker updates, access to user/terminal identifications and security to the user/file/access-type level.

A perpetual license for either DOS or OS costs \$2,950 from 97 S. Nome St., Aurora, Colo. 80012.

Tool Links Micro, CPU

(Continued from Page 49)

- Download financial information, source programs and other mainframe-based files to the IBM Personal Computer for use with micro-based software packages such as Micropro International Corp.'s Wordstar.

- Upload data and documents from the IBM Personal Computer to the mainframe for financial consolidations, use word processing interfaces, compilers and other mainframe-based software.

- Upload and download various files for distributed processing applications.

- Use either the Personal Computer or the mainframe as a vehicle for Personal Computer-to-Personal Computer and mainframe-to-mainframe file transfers.

Two versions of the package currently are available. Personal Please, which supports a single copy of Relay, retails for \$99. Corporate Please, which supports multiple copies of Relay, retails for \$1,495.

Please will be available beginning in August. The vendor noted that all Corporate Please orders received until October 31 will be shipped with five copies of the Relay communications software for the IBM Personal Computer at no additional charge.

VM Personal Computing, Inc. is headquartered at 60 E. 42nd St., New York, N.Y. 10165.

Works With DL/1

Altergo Updates 'FQS'

WOBURN, Mass. — Altergo Products, Inc. has announced a new release of its Friendly Query System (FQS). Release 1.2 includes enhancements and makes the product available to users of IBM's DL/1 data base management system under IBM DOS or OS operating systems with IBM's CICS or Altergo's Shadow II teleprocessing monitor.

FQS can process queries against DL/1 files and any other standard files using the standard file control facilities of the CICS or Shadow II teleprocessing monitors, a spokesman said. FQS runs as a transaction under the teleprocessing monitor and uses menus, prompts and Help facilities. Reports can be constructed

based on field-level selection criteria without the user needing to know how the file is held.

New reporting facilities include a form of JOIN command to link two files logically. Other features include array handling, a sort option, maximum and minimum statistics, totals and averages and formatting enhancements.

The release also includes an option that enables users to save and label query-retrieved data using a single name, the spokesman said. The name can be used to recall the data.

The products costs \$15,000 for DOS or \$18,000 for OS from Altergo at 400 W. Cummings Park, Woburn, Mass. 01801



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'Dipos 2.1,' Two Versions of 'Dpex' Released

WALTHAM, Mass. — Nixdorf Computer Corp. has released a new operating system for its 8860 Distributed Information Processing System (Dipos). The company also announced two new versions of its Distributed Processing Executive Operating System, Dpex II and Dpex III, for its 600 Series Distributed Data Processing Systems.

Dipos 2.1 for the 8860 includes a job control system, full screen editor, printer spooling, enhanced Cobol compiler and runtime system and emulators for IBM 3270 Binary Synchronous Communications, 3770 Systems Network Architecture (SNA) and 3270 SNA/Synchronous Data Link Control terminals. Users can insert, edit and delete lines of

text and perform global search and replace functions in full screen format, a spokesman said. Other facilities have been added for faster generation of Cobol source programs. Dipos costs \$1,600 for a perpetual license or \$112/mo.

Dpex II and Dpex III feature improved data entry, data management and Editor programming language features of the older version of Dpex.

Other enhancements include file lock/unlock, enhanced management control, password protection for libraries, multiple identifications, library tools, user-defined communication port assignment, batchless edit and output, support for multiple I/O devices, creation of data files and

device availability checks.

A conversion program for current customers is offered. A perpetual license for Dpex II costs \$3,500 or \$70/

mo. A perpetual license for Dpex III costs \$7,500 or \$150/mo. All products are available from Nixdorf at 300 Third Ave., Waltham, Mass. 02154.

'Job Production Scheduler' Fits DOS/VSE Installations

COSTA MESA, Calif. — Daley Marketing Corp. has announced Job Production Scheduler, a computer production documenter and scheduler for IBM DOS/VSE installations.

The system produces documentation, production scheduling and report distribution control in batch or on-line systems, IBM Vsam files or

IBM's DL/1 data base management system, a spokesman said.

The CICS versions are organized into four files allowing on-line inquiry and updating of the data base by report number, report name, job name or report distribution code number. Documentation of setup, computer operations and report distribution using individual report covers is featured in addition to the daily job schedule, output data set labels and master listings.

The package includes a relocatable module which provides an interface with the major tape management systems for control of input tape data sets, the spokesman noted.

A perpetual license costs \$4,000 to \$6,000 from Daley at Suite 207, 1700 Adams Ave., Costa Mesa, Calif. 92626.

'Backup/CMS' Announced For VM/CMS

SUNNYVALE, Calif. — Backup/CMS, a minidisk backup and restore product for IBM VM/CMS systems, has been introduced by Boole & Babbage, Inc.

Backup/CMS reportedly runs as a disconnected virtual machine to produce backups of CMS formatted minidisks on tape, and it restores files selectively or en masse. It is said to save tape usage by doing logical instead of physical backups and to reduce the need for manual intervention by using an automatic backup facility.

The software allows CMS minidisk backups or restores to be controlled by a centralized system programmer or the user. Backups can be invoked automatically or manually on a daily, weekly or monthly basis. An on-line catalog offers partial or complete restore of a minidisk.

Backup/CMS operates under VM/370 Release 6.0.0 and is priced at \$5,000 for a perpetual license. Product maintenance is free of charge for the first year and 15% of the prevailing license fee thereafter. The vendor is located at 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.



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management software in the industry), and a common data base.

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Fits IBM DOS, OS

'ADS' Gains DL/1 Support

OKLAHOMA CITY, Okla. — Progressive Software, Inc. has announced full support of IBM's DL/1 data base management system for its applications development system (ADS).

The system offers access to the DL/1 data base through its own data base definition, which defines the hierarchical structure, a spokesman said. Functions such as read, update, add and delete can be limited to one or more segments per function.

The system requires no IBM CICS programming expertise, and no DL/1 experience is required to support DL/1, the spokesman said. The product is available for IBM DOS and OS operating systems. Its file handling

facility supports IBM Isam, Vsam, Bdam and sequential files. Progressive's ADS will access any file on the host system including files not defined to CICS.

ADS costs \$17,000 for the DOS version and \$23,000 for the OS version from Progressive Software, 8265 S. Walker, Oklahoma City, Okla. 73139.

Tasc Updates 'Trailblazer'

READING, Mass. — The Analytic Sciences Corp. (Tasc) has announced a new capability for its Trailblazer testing package.

The Transaction File Extractor (TFE) cuts machines resources and time required to test large IBM batch application programs, the company claimed. Available for IBM OS operating systems, TFE creates a small test file from a large production file without decreasing the test coverage. The extract file can also be used to assist a programmer in generating a matching test master file, according to a vendor spokesman.

TFE is said to require no knowledge of data record layouts or program logic and works on any sequentially processed file where the transactions are largely independent of each other.

A one-time license fee for the product starts at \$15,000, the spokesman said from Tasc at 1 Jacob Way, Reading, Mass. 01867.

Bank Handles Growth, Merger With Utilities

(Continued from Page 49)

ed July 1, and the system was upgraded to CICS by the end of September. It would have taken three times longer without the software," he added.

At the time of the change from a one-computer to a two-computer operation, the decision was made to convert from IBM's DOS/VS to DOS/VSE operating system. Currently, Metropolitan has a 10-person DP staff that includes two managers, a secretary, three systems analysts, an operations supervisor, two operators and a programmer.

The firm has an IBM 370/158 and a National Advanced Systems, Inc. AS-5 running DOS/VSE, and these are supporting 77 IBM 3600 series teller workstations and 21 IBM 3277 and 3278 CRT terminals running under IBM's CICS/VS.

"We also chose to go into production under VSE with Panexec operational," Emerson explained. "We started the VS-to-VSE conversion in late December. We were in production in late January, with both computers operating in place under DOS/VSE with Panexec. We used Panexec and made no changes to our production JCL. We moved all of our programs directly to Panexec, and executed our production out of Panexec."

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'Basis' Now Fits Prime, Wang

COLUMBUS, Ohio — Battelle, Inc. has announced the availability of its Basis data management system on Prime Computer, Inc.'s Prime 50 series and Wang Laboratories, Inc.'s VS series of computers.

The modular system can handle large volumes of letters, memos, reports and other data. The system features storage and retrieval modules that can be used by noncomputer specialists. Data can be accessed with a nontechnical query language.

Capabilities include index and actual records searching, term or phrase searching, proximity and range searching, menu-driven searching and index browsing. A Basis thesaurus capability permits vo-

cabulary standardization. The system also allows reports to be defined and produced on-line.

Basis is also available on the Digital Equipment Corp. Decsystem-10 and 20 and VAX-11 series; IBM 370, 30 series and 4300 series; Control Data Corp. Cyber and 6000 series; and Sperry Corp. 1100 computers.

The price for the central system on the Prime 50 and Wang VS series is \$26,600. The additional modules and their prices are: Forms, \$4,900; Reports, \$7,000; Monitor, \$3,500; Olive (on-line input verification and editing), \$10,500; Sort, \$2,100; Thesaurus, \$5,600; Profile (procedure files), \$5,600; and Computation, \$7,000. Battelle's Columbus Laboratories is located at 505 King Ave., Columbus, Ohio 43201.

Cobol Tool, Generators Enhanced

AUBURN, Ala. — A revised Cobol application software development tool and a new add-on enhancement for access to Data General Corp.'s Infos II Data Base Access Module have been announced by Commercial Systems Laboratories, a division of Commercial Systems Corp.

C/Script II Revision 3.0, an enhanced version of C/Script II, is compatible with DG's Realtime Disk Operating System, AOS and AOS/VS and Unix. It reportedly includes additional functions such as the capability to add up to five secondary files to the file maintenance program generator, with three levels of supplemental file verification that can also be used to edit master file fields; parameter maintenance; and an approximate search feature enabling inquiries of the data fields in forward and reverse order.

Commercial Systems also announced the availability of an add-on enhancement to C/Script II Cobol program generators for access to any valid data base access method (Dbam) structure. C/Script II Plus Dbam generates standardized report, file maintenance and inquiry programs which access up to 32 levels of Dbam index structure, according to the vendor.

The cost of the complete C/Script II 3.0 software development tool kits starts at \$5,500 for Unix-compatible environments. In the AOS-Cobol environment, \$16,000 will purchase a complete kit, and the AOS/VS total cost is \$20,000. C/Script II Plus Dbam lists as a \$4,000 add-on to the current C/Script II prices. For further information, contact Commercial Systems Laboratories, through P.O. Drawer 2710, Auburn, Ala. 36831.



'If It Doesn't Work, Don't Kick It, Chances Are the Plug Is Out.'

Machine Cognition Releases Source Librarian System

EVERGREEN, Colo. — Machine Cognition, Inc. has announced a new source librarian (SL) system for Prime Computer, Inc. computers.

The system reportedly allows multiple retained versions of source files, tracks program updates, facilitates backtracking of changes and generates various user and management reports.

Each software project has its own library directory containing all source files, a history of all changes made to each file and author comments. With generation expressions, users may retrieve either a specific generation of a file or the latest in a particular line of descent. Named

families of related files within the library that are to be manipulated as a group may be defined. A file may be reserved by a user.

Each user known to SL for a particular project has a list defined by the system administrator of commands that may be executed. Generations of insert files are automatically handled for all Prime-supported languages. Commands exist allowing users to generate various reports of the current status of a project. The package is written in the Prime SPL systems language and costs \$3,500. Machine Cognition can be contacted through P.O. Box 1975, 938 S. Valley, Evergreen, Colo. 80439.

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NEC	Micom Systems
Northern Telecom	Moore Business Forms
Olivetti	North Star
Racal-Milgo	Okidata
TIE Communications	Prime Computers
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Planned around the show are other invaluable events for people wanting to learn more about this important market—

- Pan American Technology Policy Forum: 40 governmental policy makers discussing future Caribbean networks.
- Three-day computer and communications conference for corporate executive users: organized by the Puerto Rico Data Processing Management Association (DPMA) and the Puerto Rico Chamber of Commerce.
- Caribbean Basin Initiative (CBI) Trade and Investment Seminar: sponsored by the U.S. Department of Commerce.
- Caribbean Islands' national pavilions: organized by national governments.

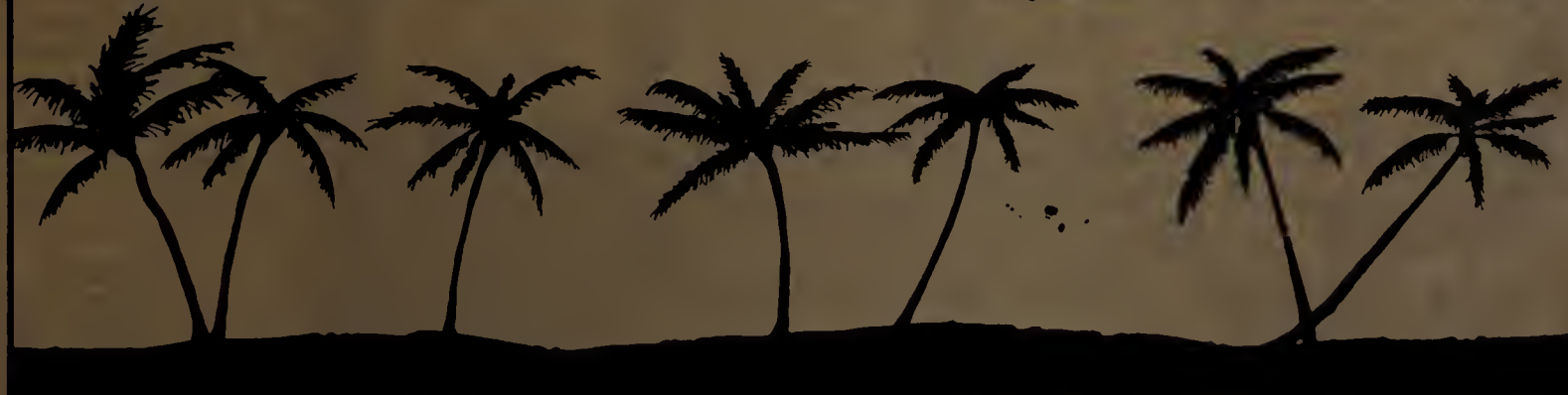
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Unix Version for Domain Series Also Bows

Apollo Operating System Release 6.0 Unveiled

CHELMSFORD, Mass. — Apollo Computer, Inc. has announced Release 6.0 of its Apollo operating system, said to feature improvements in sequential file processing, computational and graphics

performance and user functionality.

Apollo also released Aux, a version of the Unix operating environment for its Domain series of computational workstations.

Among the enhancements included in Release 6.0 of Apollo's operating system are a vector library said to optimize access to the firm's floating-point hardware, as well as reworked graphics primitive commands for increased efficiency.

Functional improvements include enhanced display-manager commands that permit high-speed graphics interaction using multiple-screen window formats and feature an UNDO command for recovering

from command errors, the vendor said.

The operating system is part of the firm's Domain series of workstation hardware. The monochromatic DN300 costs \$10,000 to \$20,000; the monochromatic DN420 costs \$25,000 to \$35,000; and the color DN600 costs about \$50,000, all depending on configuration.

Apollo's Aux software reportedly is the firm's implementation of Bell Laboratories' Unix System III with University of California at Berkeley's Unix extensions. Intended as a supplement to Apollo's standard operating environment for its worksta-

tions, Aux is said to give users access to a Unix environment that supports networkwide virtual memory.

Among the over 100 commands available to users of Aux is the Unix-to-Unix communications program, which is said to give Apollo users the ability to send electronic mail messages between local and remote Unix systems.

The Unix-based operating environment costs \$1,000 per workstation, according to a spokesman for the vendor. Apollo Computer is located at 15 Elizabeth Drive, Chelmsford, Mass. 01824.

System Manager Tool Out for VAX-11 Users

BURLINGTON, Mass. — Strategic Information has announced Systemmaster, an automated system manager for users of Digital Equipment Corp.'s VAX-11 processors running under Release 3.1 or higher of DEC's VMS operating system.

Aimed at users responsible for the operation and management of VAX-11 systems, the package can serve as an alternative to a long, formalized training program. Features include an on-line Help facility, a menu-driven format with screen-oriented data entry and function keys similar to those used on a DEC VT100 terminal, the vendor said.

System management tasks include disk utilities which handle menu mounts, dismounts and disk volume initialization. A user authorization menu defines groups and individual accounts, and the print queue menu creates and controls print queue operation, the vendor said.

Systemmaster is a customer-installed product. The installation kit comes with software, installation guide and user guide. A perpetual license fee for use of the package on VAX-11/782 and 780 systems is \$3,500. A license for VAX-11/750 is \$2,500, and the package costs \$1,500 for VAX-11/730 sys-

tems from Strategic Information, 80 Blanchard Road, Burlington, Mass. 01803.

UCC Offers CTP Processing As Module of 'Pips' System

DALLAS — University Computing Co. is now offering Corporate Trade Payment (CTP) processing as a module of its Paperless Item Processing System (Pips) distribution, accounting and proof system.

Pips is said to provide financial institutions with an interface to automated clearinghouses for electronic fund transfers. CTP reportedly will reduce trade payment processing to one step.

The CTP module provides a fee-generating service and

can process as an originating or receiving institution on a corporation's behalf. CTP also provides a control file for CTP processing and service-charge options on a corporate-to-corporate basis, the vendor said.

CTP runs on IBM systems running under DOS and OS operating systems or Burroughs Corp. medium-size mainframes. The software costs \$12,000 from University Computing at UCC Tower, Exchange Park, Dallas, Texas 75235.

Integrity Updated for DG

WHITE PLAINS, N.Y. — International Technology Group, Inc. has announced Release 4.0 of its Integrity operating system for Data General Corp. S/140 mini-computers.

Release 4.0 includes external subroutine calls, enhanced Basic commands and support for various Control Data Corp. disk drives.

The Integrity operating

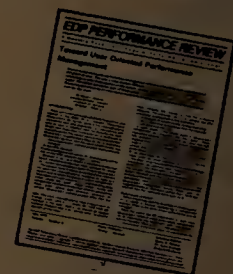
system is compatible with Mini-Computer Systems, Inc. Micros operating system Release 11.2.

A low-end S140 system, capable of supporting up to eight users, costs \$33,000 with the Integrity Release 4.0 operating system. A 64-user system costs \$175,000, International Technology Group said from 3 Barker Ave., White Plains, N.Y. 10601.

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'Con'vey' Offers Interface to Ease Vsam Complexity

NEW YORK — Condor Technology, Inc. has announced Con'vey, a transparent central interface between Cobol, Fortran, PL/I and Basic assembler language and all possible IBM Vsam accesses.

Con'vey, which operates in batch and on-line under any large-scale IBM operating system, eliminates the complexities of Vsam source code syntax by providing a standard call to a centralized subprogram, the company claimed. It reportedly enables programmers without Vsam knowledge to use Vsam programming techniques. Supported Vsam functions include skip sequential processing; spanned records, forced buffer writes, reading files backward and asynchronous processing.

At runtime, Con'vey operates over 60% faster than Cobol Vsam, the company said. A perpetual license costs \$12,000 from Condor Technology at 200 Madison Ave., New York, N.Y. 10016.

'Cuffs-88' Fits IBM 370 Series, DEC VAX-11s

NEW YORK — Cuffs Planning & Models, Ltd. has announced Cuffs-88, a decision support package for users of IBM 370 series mainframes and Digital Equipment Corp. VAX-11 series and Decsystem-20 processors.

The package incorporates a specialized language that can be used to define modes in the package. The language incorporates features that allow analysts to set up relationships that require complex decision rules. Tax computations, bond portfolio manipulation and joint venture analysis are some applications for the package, the vendor said.

Cuffs-88 employs a nonprocedural, equation-like approach that allows step-by-step creation of non-standard functions, the vendor said. It reportedly includes an expanded modeling language and a tree-structured data base, which allows data processed by the model to be organized, consolidated and referenced naturally as normal reporting lines, projects or locations.

Cuffs-88 costs \$35,000, Cuffs Planning & Models said from 201 E. 87th St., New York, N.Y. 10028.

'Vcomp' Announced For HP 3000 Users

AUSTIN, Texas — Cole & Van Sickle Co. has announced Vcomp, a package for the Hewlett-Packard Co. HP 3000 minicomputer that is said to allow users to stream batch jobs to compile and list form files from HP's Vplus form file handler.

Performing the operations in batch avoids tying up terminals during compiles and listings, a spokesman said. The package shifts CPU-intensive compiles to the lower priority batch jobs.

The package costs \$300 from Cole & Van Sickle at United Bank Tower, 400 W. 15th St., Austin, Texas 78701.

'Cogen' Operates on Prime Minis

BERKELEY, Calif. — Bytek, Inc. has announced that its Cogen Cobol program generator can now operate on minicomputers manufactured by Prime Computer, Inc.

Cogen replaces the coding process

'CICS-Aids' Targets CICS Uptime

MOUNT FREEDOM, N.J. — Macro 4, Inc. has introduced software said to provide IBM DOS/VSE users with the means to increase IBM CICS uptime, while improving response time for remote users.

CICS-Aids comprises three facilities:

- Storage Violation Protection reportedly allows user-specified transactions to be monitored.

required to develop Cobol business applications involving files, screens and reports. Instead of coding, the Cogen package reportedly uses prompts and "painting" techniques.

The Cogen package can now oper-

- Dynamic On-Line Table Update is said to provide multiple, on-line extensions of the Processing Program and Program Control tables.

- Automatic Data Compression reportedly reduces line time and queueing time.

The package leases for \$100/mo on a one- or two-year lease from Macro 4 at 1 W. Hanover Ave., Mount Freedom, N.J. 07970.

ate under the Primos operating system. The package includes a descriptive terminal data base that is expandable with regard to the types and features of terminals it will support. This feature implements screen functions, such as cursor addressing and area erasures, in a terminal-independent fashion. The Cogen data base is the foundation for a complete screen-handler package that provides an optimized, multiple-frame screen management resource and a key-to-function mapping resource, the vendor said.

The Primos version of Cogen costs \$7,500, and a maintenance agreement is available. More information is available from Bytek at 1730 Solano Ave., Berkeley, Calif. 94707.

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Dialogue Version Runs Applications on VAX-11

TORONTO — Standard Software Corp. has announced a version of its Dialogue package for the Digital Equipment Corp. VAX-11 computer.

Dialogue for the VAX-11 reportedly makes applications terminal-independent and supports any type of terminal or microcomputer linked to the VAX-11. It is a tool for developing and running record-oriented interactive applications. It acts as an interface between the terminal or microcomputer user and an application, a spokesman said.

Dialogue features for VAX-11 include full support for all terminal and microcomputer screens, block mode support and support for termi-

nals without screens. For terminals with block mode capabilities, Dialogue automatically establishes protected and unprotected areas, minimizes transmissions and enables local edit checks before sending data to the computer, the spokesman said. Data can be transmitted over packet-switched networks.

The product is priced from \$20,000 to \$35,000 from Standard Software at Suite 2200, 700 Bay St., Toronto, Ont., Canada M5G1Z6.

'Midas' Module Handles Credit Letters

NEW YORK — Business Intelligence Services, Inc. has announced a module for its Modular International Dealing and Accounting Systems (Midas) packages. The module is aimed at letters of credit transactions.

Midas can be used with IBM System/34, 36 and 38. A single input is said to produce all accounting entries, reporting and exposure updating and the letter of credit document itself, printed or sent to an international communications network.

Other Midas modules include general ledger, foreign exchange, commercial loans, money market and retail accounting. The software runs under IBM's SSP operating system and costs between \$100,000 and \$250,000 for four or five basic modules, a spokesman for Business Intelligence Services said from 110 Wall St., New York, N.Y. 10005.

Wang Unveils Report Tool

LOWELL, Mass. — Wang Laboratories, Inc. has announced VS/Report, a menu-driven, report-by-example product for its VS series of 16- and 32-bit computers. VS/Report eliminates the need to write programs for report generation and enables the user to visualize a report on the screen before it is printed, a spokesman said.

The package can be used in conjunction with Ezquery, Wang's relational query product. Upon entry to VS/Report, the user supplies the name and location of the data base to be accessed. The package presents a list of all reports currently defined for that data base. The user can run or modify existing report definitions or create a new report.

A format editor allows the user to add new fields, change text and control data representation. The report information can also be stored and modified. To create multiple versions of the report, the user specifies the requirements and VS/Report automatically generates the required version, the spokesman said.

VS/Report costs \$3,000 on the VS 25, VS 45 and VS 80 systems and \$4,000 on the VS 90 and VS 100. The product will be available in the fall from Wang at One Industrial Ave., Lowell, Mass. 01851.



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Runs in Most Unix Environments

'Emacs' Editor Out From Unipress

HIGHLAND PARK, N.J. — Unipress Software, Inc. has announced the availability of the Emacs screen editor on a range of hardware configurations.

Written in C language and capable of running in most

'Accu-Pay,' 'Pass' Fit DG's Eclipse

CONSHOHOCKEN, Pa. — Personnel Data Systems, Inc. has announced that its Pass personnel and Accu-Pay payroll systems are available on Data General Corp.'s Eclipse computers.

Pass and Accu-Pay comprise a human resource management system to automate the recordkeeping of personnel and payroll functions. The Pass software organizes volumes of personnel records in a prescribed format. Accu-Pay software calculates pay and produces pay-related registers, a spokesman said. The packages may be installed separately or as an integrated system and operated in batch or on-line.

Pass creates a variety of standard reports and may be interfaced with an existing payroll system. Accu-Pay features include automatic check reversal, automatic deduction arrearage collection, automatic pay (exception basis), check reconciliation, multiple cost centers and multiple time cards.

The systems include a reporting feature that allows the user to access the file and create special reports without knowledge of programming. The Personnel Data Systems Report Writer can make calculations, summarize statistics in any report sequence and format them to specifications.

The Pass/Accu-Pay software is priced between \$19,000 and \$75,000, depending on modules chosen from Personnel Data Systems at 15 E. Ridge Pike, Conshohocken, Pa. 19428.

Unix environments, Emacs is a full-screen text editor that includes multiple windows, search and replace commands and automatic indenting and parenthesis checking.

Each version of Emacs communicates with the underlying operating system, so users can execute system commands and programs from within an Emacs win-

dow, a vendor spokesman said.

Emacs also runs on Digital Equipment Corp.'s VAX-11 under DEC's VMS and Unix operating systems and systems based on Motorola, Inc.'s MC68000 under Unix.

Prices for Emacs range from \$395 to \$995 from Unipress Software at 1164 Raritan Ave., Highland Park, N.J. 08904.

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TI Issues Revised Cobol Generator for DS990

AUSTIN, Texas — Texas Instruments, Inc. has announced a new Cobol Program Generator (CPG) said

to speed the development of update and report programs for TI DS990 and Business Systems Computers.

'DAP' Generates RPG Code

CARSON CITY, Nev. — Advanced Data Systems, Inc. has announced the Design Aid Program (DAP) for IBM System/34 and System/36 minicomputers.

The DAP package generates file update programs using RPG source code. The program also includes screen source specifications that can be used for file maintenance, the vendor said.

Two forms of update logic may be selected. One form is similar to the update logic supplied by IBM, and the other is a passive add/change/delete function. The product also produces a documentation listing for the file on request, the vendor said.

The RPG source code generated by the DAP package can be modified in any way for customization. Thus, field edits and other enhancements may be added to the update program subsequent to generation. The source code is written in a structured style and is anno-

tated to facilitate modification, the vendor said.

The package costs \$500, Advanced Data Systems said from 4520 Wagon Wheel Road, Carson City, Nev. 89701.

Based on the System 80 developed by Phoenix Systems, Inc., the enhanced TI CPG includes a new selection menu structure, a separate screen for each menu selection and a complete rewrite of the users manual.

The TI CPG runs under TI's DX10 and Dnos operating systems and is said to be capable of producing more than 5,000 lines of error-free Ansi 74 Cobol source code

per day.

The programs the CPG generates run under any operating system supporting Ryan-McFarland Corp. RM/Cobol. While the generator itself does not require a Cobol compiler, the company said a TI Cobol compiler or an RM-Cobol compiler must be available to compile the Cobol programs generated by CPG.

TI will market the modi-

fied CPG to TI customers under an agreement with Phoenix Systems. Ready for shipment by the end of August, TI CPG will cost \$6,000 for the hard disk version and \$5,200 for the flexible disk and tape versions. Subscription support is available at a cost of \$1,100. Further information is available from TI, Data Systems Group, P.O. Box 402430, H-659, Dallas, Texas 75240.

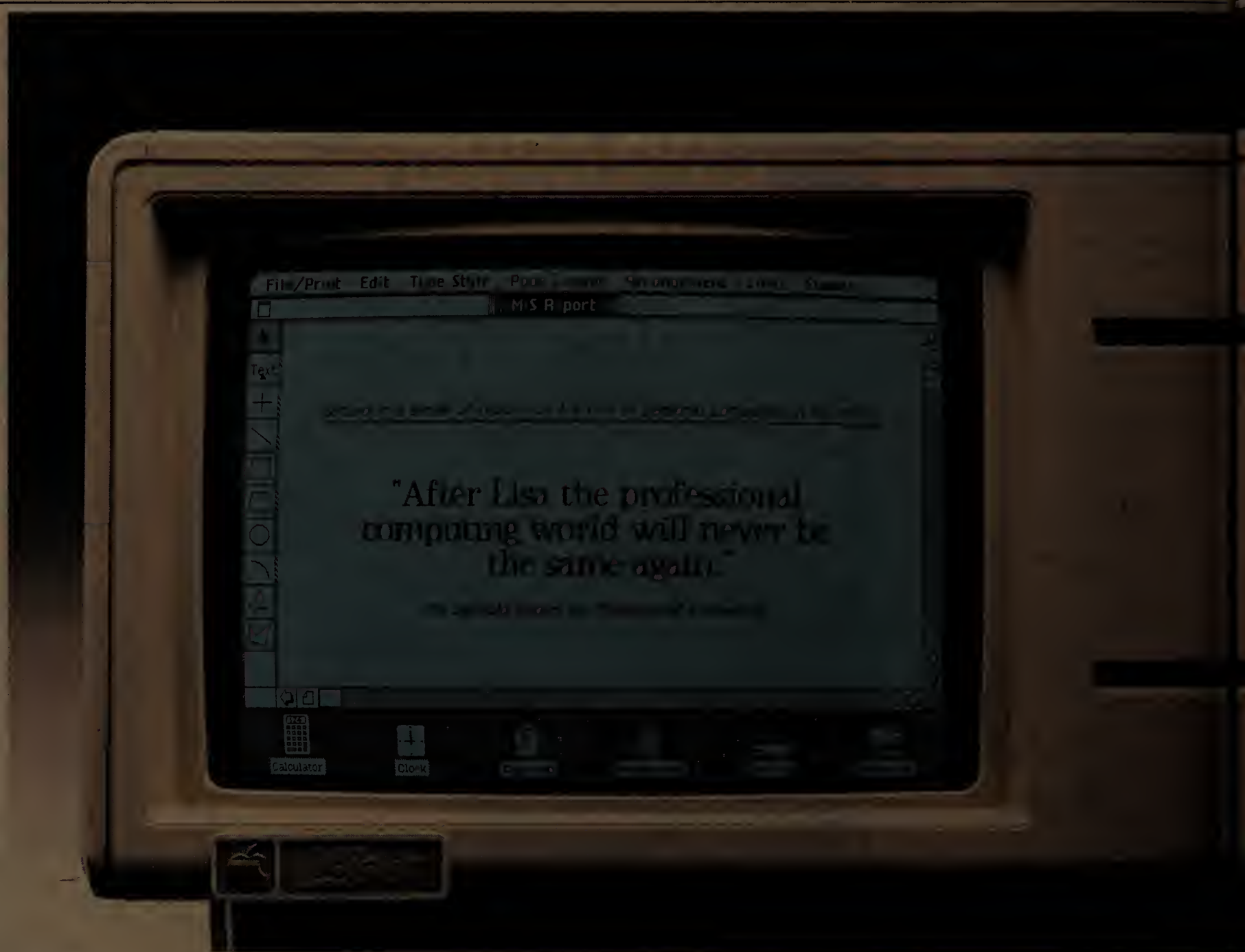
Utility Interfaces To Idcams

SAN RAFAEL, Calif. — Fireman's Fund Insurance Companies has announced Utypams, a utility program that reportedly provides added flexibility for IBM Vsam users by offering an interface to IBM's Idcams.

Utypams is used to define Vsam data sets in the same way a job control language and symbolic parameters are used to describe non-Vsam data sets. The package can also be used to scratch and uncatalog data sets prior to an application processing step, the vendor said.

The Utypams package invokes the Idcams, eliminating the requirement for specific volume serial numbers otherwise required in Idcams control statements. In addition, users may make data substitutions on Idcams statements to allow flexibility for variables such as cycle codes and space requirements, the vendor said.

The Utypams package and documentation costs \$1,500. More information is available from Alan Spencer, Marketing Manager for Outside User Services, 1600 Los Gamos, San Rafael, Calif. 94911.



Apple's new Lisa is the world's most powerful personal computer.

Its 32-bit MC68000 microprocessor gives it the processing capability of a mid-range mainframe.

It also has one million bytes of internal memory. And, with a 5-Megabyte hard disk, more than 15 times the on-line mass storage of standard microcomputers.

Given these most imposing credentials, one could get the impression Lisa was designed solely to scare one's socks off.

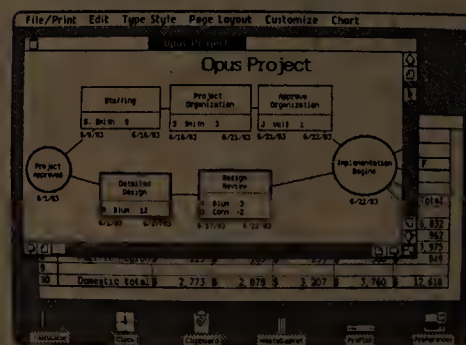
On the contrary.

What makes Lisa totally revolutionary is that, for the first time, all this phenomenal power is contained in a business computer you can learn to use in under 30 minutes.

200 years of hard work made it easy.

To tell Lisa what to do, all you have to do is point.

But achieving this simple concept required a totally new



Lisa's revolutionary software lets users perform several applications simultaneously, even "cut" and "paste" them together. The powerful project management program seen here is a Lisa exclusive.

approach to software and 200 person-years of development.

Lisa replaces complex computer commands with symbols

familiar to anyone who's ever worked at a desk.

Even someone who's never touched a computer before can learn Lisa in under half an hour. Versus the 20 hours or more required to unriddle conventional PC's.

To information managers, that means dramatically reduced training time and increased productivity.

But people don't just learn faster on Lisa, they also work faster. Each of Lisa's powerful applications* use symbols and commands common to all. So with little practice, users can move from LisaCalc to LisaGraph to LisaWrite without missing a beat. Or use them all at once, "cutting" information from one program and "pasting" it directly into another.

Interactive 'Edds' Gets Update

WALTHAM, Mass. — Software Vision Co. has introduced a new version of its interactive business graphics package for Digital Equipment Corp. VAX-11 minicomputers.

Version 2.5 of the Executive Data Display System (Edds) is said to be an enhanced version with improved facilities for interactive data entry and a new module integrating Edds with Supercomp 20, a

spreadsheet program developed by Access Technology, Inc.

The module transfers both data and alphanumeric labels from a Supercomp 20 "export" file into Edds for immediate production of presentation-quality charts and graphs of the spreadsheet data, Software Vision said.

A permanent binary license for the software on DEC VAX-11 costs \$6,000. Further information is avail-

able from James Tympanick, Software Vision, 1124 Main St., Waltham, Mass. 02154.

APL Interpreter Enhanced

FARMINGTON HILLS, Mich. — Mips Software Development, Inc. has announced Version 5.0 of its APL interpreter for Prime Computer, Inc. systems. The Mips implementation is a superset of APL running on IBM systems.

GRANDVILLE, Mich. — The Core Division of Herman Miller, Inc. has an-

nounced an expanded version of its Viewpoint facility design and management system that includes a two-dimensional graphics program.

The release includes eight new APL system functions including string search, BOX, VI and FI. The product costs \$14,500 from Mips Software, Suite 104, 31555 W. Fourteen Mile Road, Farmington Hills, Mich. 48018.

Viewpoint includes facility management software for communications analysis, task/equipment analysis, equipment specification, space and inventory management and space planning. The system is based on a Digital Equipment Corp. PDP-11 minicomputer.

Interactive Design and Drafting (IDD), the graphics software, includes capabilities for drawing lines and shapes, measuring and dimensioning spaces, placing architectural symbols, generating corresponding schedules and manipulating equipment/furniture images for space planning. IDD was designed to operate on the Chromatics, Inc. 7900 color raster graphics terminal.

IDD will be available in late autumn. Prices for an IDD-based Viewpoint system start at \$110,000 from the Core Division of Herman Miller at 2855 44th St. S.W., Grandville, Mich. 49418.

ASI Adds Four Courses To Library

ARLINGTON HEIGHTS, Ill. — Advanced Systems, Inc. (ASI) has added four courses to its videotape library of more than 2,300 multimedia courses.

The firm's addition to its IBM MVS/SP JES2 and MVS/SP JES3 operating system curricula is the "MVS/SP Vsam and Basic AMS Course," designed for application programmers, system programmers, programmer trainees and those who code or test application programs.

"Management Strategies: Office Automation — Improving Office Productivity Through Technology" is aimed at senior management as well as middle and line managers. The course formulates a strategy for implementing an office automation program.

For the Cullinet Software, Inc. IDMS curriculum are the "Culprit and EDP-Auditor Education Series and Reference Library" and "EDP-Auditor Education Series." The first is designed for programmers and data base administration staff.

The complete ASI course library is available on a contract basis, with prices varying depending on quantity, a spokeswoman said from 2340 S. Arlington Heights Road, Arlington Heights, Ill. 60005.

Powerful connections.

Any Lisa system can become part of a powerful Lisa network through AppleNet, our own low-cost local area network.

It enables a user to transfer documents from one department to another, so they can be rapidly reviewed. Or modified. Or passed on to other Lisas.

The same network allows Lisas to branch out to other Apples. Or share disks, printers and other costly peripherals.

Using the LisaTerminal program, Lisas can tie into mini and mainframe computers, by emulating VT 100-type or 3270-type terminals.

And soon Lisa will provide a revolutionary link to Cullinet's Information Database for mainframes.

In short, one Lisa can do the chores of many terminals. All of which means swifter response times and better distribution of resources.

Stay on top of new developments.

Lisa's unique user interface lets programmers develop programs with unaccustomed speed.

But that's not Lisa's only programming attraction.

The Lisa Workshop provides a powerful environment in which to develop COBOL applications. A full screen Lisa-like editor, code generator, and multiple windows make a

visible difference in development times.*

Apple also supplies all the documentation, instruction, and support a developer requires to integrate applications into the Lisa environment — no matter how sophisticated their information processing needs.

We support the whole family.

Apple now offers nationwide on-site service for all Apples in conjunction with RCA Service Company.

The hand operated mouse lets you use Lisa without touching the keyboard. All you have to do is point.

Plus a host of special services for Lisa — including a toll-free support line.

All of which you may never need.

A diagnostic program called LisaTest instantly isolates any defective board or component.

And the modular "plug-in" design of Lisa's five basic circuit boards and two disk drives allows parts to be replaced in seconds, with just one tool: Your fingers.

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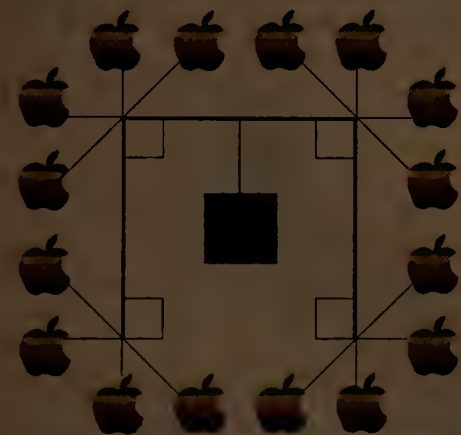
No matter how large your company, Apple has all the elements to improve your information systems management.

Including Lisa, the computer that makes headlines.



There's even a program — LisaProject — that lets you use the mouse to chart the progress of complex projects, automatically recalculating when deadlines or resources change.

On paper, Lisa is just as exceptional. With its dot matrix and daisy wheel printers, it produces printed materials just as you see them on the screen.



AppleNet, available soon, will let Lisas and other Apples share information, and costly peripherals.

*With more programs on the way, Lisa's library now includes LisaCalc electronic spreadsheet, LisaList data base, LisaWrite word processing, LisaGraph business graphics, LisaDraw presentation graphics, LisaProject electronic project management and LisaTerminal data communications. For information regarding corporate purchases through our National Account Program, call (800) 538-9696. In Canada, call (800) 268-7796 or (800) 268-7637. Or write to Apple Computer Inc., MIS/EDP Marketing Dept. 20525 Mariani Ave., Cupertino, CA 95104. ©1983 Apple Computer Inc.

Inventory Control Package Out for HP 3000

ARLINGTON HEIGHTS, Ill. — Bakco Data, Inc. has announced an inventory control package for the Hewlett-Packard Co. HP 3000.

The package reportedly can handle up to 99 different warehouses and maintain an individual inventory control for each location, including sales trend information. The package reserves the inventory while entering the customer orders into the system, and a variety of customer orders are supported, the vendor said.

It also provides daily inventory shortage reports based on user-defined rules, as well as inventory

stock status reports with sales trend and lost sales information on demand.

The Bakco inventory package reportedly provides a series of analytical inventory reports such as: damaged and short inventory reports, inventory variance reports, slow moving inventory reports, inventory turn and earn reports, inventory audit reports, inventory service reports and new product stock status reports.

The package costs \$12,500 from Bakco Data at Suite 190, 85 W. Algonquin Road, Arlington Heights, Ill. 60005.

For Honeywell Users Security System Enhanced

MECHANICSBURG, Pa. — Caci, Inc.-Federal has announced Release 2.0 of its Security II on-line security system for users of Honeywell, Inc.'s Data Management IV/Transaction Processing package operating on Honeywell Level 66 and DPS 8 computers under Honeywell's Gcos operating system.

Enhancements include automatic password changes, user access audits, attempted violation audits and security change audits that are accessible and maintainable on-line, a spokesman said. Terminal lock-outs and security alert are provided for successful attempted security breaches.

In addition, transaction processing is limited to authorized users,

and permission can be restricted to query or update for a given user/transaction as defined by the security administrator. Security verifications and modifications are maintainable on-line.

Security II costs \$7,300 from Caci, Inc.-Federal, Advanced Systems Department, 5010 Trindle Road, Mechanicsburg, Pa. 17055.

Adage Package Introduced For Workstation

BILLERICA, Mass. — Adage, Inc. has announced a programming system for use with its Adage 4145 workstation that was designed to off-load host computers by performing functions locally in the workstation.

Modeled after the proposed Association for Computing Machinery Siggraph Core standard, the Adage Core System (ACS) package comprises a Fortran subroutine library and ACS microcode for the 4145s.

Device drivers are available for Digital Equipment Corp. VAX-11 computers under VMS, DEC PDP-11s under RSX-11M and Sperry Corp. V77s under Sperry's Vortex operating system.

Said to offer extensive features for graphics applications designers, ACS costs \$4,000, including ACS host routines, workstation microcode and program debugger. Device drivers cost \$3,000 from Adage, One Fortune Drive, Billerica, Mass. 01821.

CBT Course Out For 'SAS' Users

SANTA MONICA, Calif. — Crwth Computer Coursewares has announced a computer-based training (CBT) course for users of SAS Institute, Inc.'s SAS software.

"Using SAS" is divided into basic, intermediate and advanced sections, all of which are included. Operating under a CBT presentation system such as IBM's IIS or IIPS or Goal Systems International, Inc.'s Phoenix, the course is presented in a series of text and question screens.

The full course takes approximately 20 hours for the novice.

The software is available for a 30-day free trial. A yearly license costs \$3,750; a perpetual license costs \$7,500.

Crwth Computer Coursewares is located at Suite 200, 613 Wilshire Blvd., Santa Monica, Calif. 90401.

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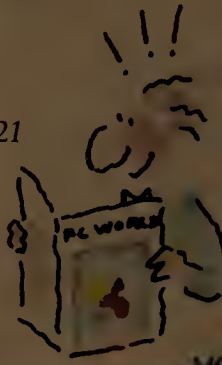
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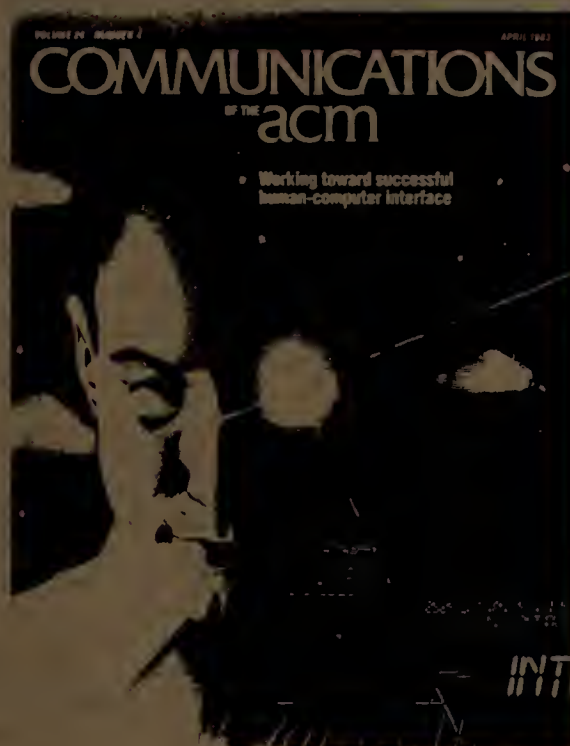
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CUT APPLICATION ALONG DOTTED LINE

Micronotes

Lotus Development Corp. has announced that its 1-2-3 personal computer program — integrating graphics, spreadsheet analysis and information management functions — will be available in the fourth quarter for the Compass Computer from Grid Systems Corp., the first notebook-size computer to run the program. The price of the system will be \$495, and it will be available in computer retail outlets and through both Lotus' and Compass' direct sales force. Lotus is located at 161 First St., Cambridge, Mass. 02142.

Spectra Logic Corp. has introduced Spectra Stream DX10, a stand-alone streaming software package allowing transfer of data from disk to tape continuously, for use with the Texas Instruments, Inc. 990 minicomputer line. Designed for both start/stop and streaming ½-in. formatted tape drives, the package

is available on TI/Ansi-compatible 800 or 1,600 bit/in. magnetic tape for a one-time charge of \$500. Spectra Logic is located 1227 Innsbruck Drive, Sunnyvale, Calif. 94086.

Business & Professional Software, Inc. has developed Wang PC-Business Graphics, a business graphics software package for use with the Wang Laboratories, Inc. Professional Computer. The package will be available for a one-time license fee of \$300 from Business and Professional Software, 143 Binney St., Cambridge, Mass. 02142.

Hitech Software Engineering Corp. has announced PC200, an Intel Corp. 8088-based assembly language program that allows the IBM Personal Computer to function in a terminal mode on Data General Corp. minicomputers, emulating the DG D200 terminal, for a price of \$100.

Also announced was PCKey, which allows IBM Personal Computers to function as intelligent workstations on minicomputers or mainframes that allow I/O of Ascii characters in asynchronous fashion. PCKey is licensed on a CPU basis for \$800 for assembly language volumes one through five. Hitech is located at Suite 2754, Clark Tower, 5100 Poplar Ave., Memphis, Tenn. 38137.

Export Software International, Ltd. of Scotland has introduced for use on the IBM Personal Computer, Expert-Ease, a spreadsheet program utilizing an artificial intelligence approach in a microcomputer environment to structure relationships between various data elements. The package is expected to list for approximately \$1,500; information is available from Export Software International, 4 Canongate Venture, New St., Royal Mile, Edinburgh EH8 8BH.

Nissim Associates has introduced the Foreign Exchange Trading system, the second of its international finance systems for the IBM Personal Computer, to process spot, forward and option contracts. It is priced at \$5,800 and is available from Nissim Associates, 2714 Pine St., San Francisco, Calif. 94115.

Schonfeld & Associates, Inc. has announced Uni/Edit, a text editor for mainframes and minicomputers using personal computers and word processors as dumb terminals to perform text editing; it is designed to run with all operating systems supporting Fortran 77. A one-year license is \$800 for the first CPU, from Schonfeld & Associates, 2550 Crawford Ave., Evanston, Ill. 60201.

Microplot Systems Co. has introduced PC-Plot, a series of software products designed to allow IBM Personal Computer users to access mainframe graphics programs and dial-up services. Prices start at \$40, and packages will be introduced in August for the Victor Business Products, Inc. Victor 9000 and Texas Instruments, Inc. Professional Computer. Information is available from Microplot Systems, 1897 Red Fern Drive, Columbus, Ohio 43229.

Ferox Microsystems, Inc. recently introduced Encore, a financial modeling software package that combines features of an interactive spreadsheet with the capabilities of large-scale financial planning languages. Designed to run on the IBM Personal Computer, Personal Computer XT and Compaq Computer Corp.'s Compaq portable computer, the package is licensed for single computer use at \$1,850 by Ferox Microsystems, Suite 611, 1701 N. Fort Myer Drive, Arlington, Va. 22209.

Weiss Associates, Inc. has announced the release of the Venture Financial Planning and Analysis System, a comprehensive business application system previously available on mainframes, for use on the IBM Personal Computer at a price of \$495. Weiss Associates is located at 127 Michael Drive, Red Bank, N.J. 07701.

The CDP18S845 Microdos Operating System, a micro floppy disk operating system, and CDP18SUT70 Monitor Program, both designed for interfacing with the Sony Corp. 3½-in. floppy disk drives, are now available for \$300 and \$49, respectively, from RCA Solid State Division. Microdos provides an environment for program construction, storage, editing, assembly and program checkout while supporting up to four micro floppy disk drives; the monitor program can set up half- or full-duplex operation, load the operating system or perform a self-test. Contact RCA Microsystems, Somerville, N.J. 08776.

Micro-Systems Software, Inc. now has available its Mterm "smart terminal program" for use with the Radio Shack TRS-80 Model 4, supporting 1,200 bit/sec communications without requiring null characters and featuring both standard Ascii and error-free direct file transmission. It is priced at \$79.95, and further information is available from Micro-Systems Software, 4301-18 Oak Circle, Boca Raton, Fla. 33431.

American Compusoft, Inc. has introduced Matchpoint/86, a program to enable users of Microsoft, Inc. MS-DOS and PC/DOS equipment to insert Digital Research, Inc. CP/M 86 software disks without hardware alteration. It allows the user to call information stored in CP/M 86 format and use it while operating in PC/DOS or MS-DOS style, and vice versa. Priced at \$99, it is available from American Compusoft, 23113 Plaza Pointe Drive, Laguna Hills, Calif. 92653.

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Striking Out On Your Own

By Gene Knauer

What It Takes to Succeed as a DP Entrepreneur

Thousands of DP professionals go into business for themselves each year. Some are fueled by the excitement of a "brilliant idea." Others simply acknowledge a voice of entrepreneurialism within them that conflicts with the bureaucracy of the large corporate DP environment.

They talk about their dreams in the cafeteria. They plan and research and estimate. And then one day these analysts, technicians or managers with little or no independent business education or experience suddenly flee the office. For some, it is the beginning of a career change more profound than any promotion within their corporate MIS world.

A few DP entrepreneurs make it big, and newspapers trumpet their successes. But more often, within six to 18 months, the new venture fails. Why?

The men and women trying to turn pet projects into business realities often fared extremely well in the corporate MIS environment. They are people of ideas and proven skills. But the abilities and experience necessary for success as a technician, analyst or manager don't necessarily encompass all that is required to bring a DP-related business to life.

In this article, sufficient capital, a workable idea and the facilities to turn the idea into a marketable product are presumed. The focus here is on the

business skills and psychological make-up an individual needs to bring a new enterprise to life and make it thrive.

One way of looking at the employee/entrepreneur dichotomy is to peek inside that great CPU, the brain. Studies of the brain's processes reveal distinctions between its two hemispheres: one "creative" and more given to tangential idea generation (right), the other more quantitative and "logical." A great majority of work in a data processing environment involves left-brain, quantitative thought. System design and coding use this logic-seeking, order-creating aspect of the mind. Conceptual skills, or right-brain thought, are called upon less, perhaps

IN DEPTH

during systems design, modeling or problem solving in management.

Yet for an entrepreneur, conceptual skills play a much larger role. People able to synthesize powers of both

right and left parts of the brain bring to problem solving a new range of solutions.

John Mullen, founder of Phaser Systems, has put his talents to work as both conceptual thinker and logical

problem solver. Sitting at his downtown office on California St., in the heart of San Francisco's financial district, he taps the keys at his terminal while an opera plays on a cassette recorder. After years

of juggling ideas and scanning the systems world of DP, the 31-year-old Mullen recently sold the marketing distribution rights to his new software product to Digital Research, Inc.

Mullen's MicroSPF emulates mainframe systems software tools (such as text editors, sort-merge packages, internal debuggers, link editors) for the microprocessor. "We've taken IBM mainframe designs and concepts and rewritten them screen for screen, command for command and key for key on the microprocessor," says Mullen, casually dressed in sport shirt and jeans. A former applications and systems programmer, he majored in art and math at the University of California, Davis.

For years, think tanks from Stanford to Aspen have acknowledged the importance of right-brain creativity. One of the natural correlates of the ability to think conceptually is the ability to forecast and recognize trends. In the fast world of computer technology, product-oriented innovators must develop future-oriented concepts and sell them often years before they have the most use. In selling his concept of MicroSPF, Mullen found that while technicians understood it immediately, many marketing people did not or thought they were looking at a short-term gain.

Spectrum of Skills

While such considerations as marketability are important, people often hatch their best new ideas before they come up against hard reality. They take a romp in the playground of the right brain and then switch to left-brain mode to refine and synthesize the idea. The spectrum of skills necessary to develop and then implement an idea is rarely found in one person.

Consequently, the corporate MIS world of technicians, analysts and management has grown more specialized and segmented in recent years.

On project teams, each participant spends less time in multidimensional roles. Technicians work with tenacity primarily on problems of logic, repetition and detail — quantitative, left-brain problems. Applications specialists and systems analysts work to incorporate a variety of needs into a system design, which may have a variety of solutions rather than one logical answer. Hypothetical, right-brain digging often unearths good, better and best answers.

Acknowledging your right brain or left brain

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predilection is important when going into business. Understanding where you fit on the spectrum between the two will help determine which tasks are your forte and which are best relegated

to your employees, partner or associates.

Psychological Factors

Going into business is a gamble and, as such, often involves considerable anxiety.

Before and even after a business becomes solvent, the worries of responsibility are very much with the entrepreneur. Perhaps more than any other single factor, anxiety can destroy a business venture in its embryonic stages. Its destructive powers can cause rash judgments, impairment of objective vision and sometimes depression.

Carl Balsillie understood

the stress and bureaucratic frustrations of the corporate MIS environment. After beginning his career with Electronic Data Systems Corp. in Dallas, he rose to senior applications programmer/analyst for a large western insurance corporation and grew increasingly discouraged. "To get something into production could take forever. And as a senior applications programmer/analyst, my next step would have been management, which I didn't want any part of." Many other MIS staffers-turned-entrepreneurs share Balsillie's feelings on this point, deciding to strike out on their own before they move into management. In many cases, the longer a person remains with his employer, the less he wants to leave the corporate fold.

"If a person remains in a corporation overly long, he or she will lose heart, because the qualities that the corporation requires — competence, coolness under stress, self-confidence — are not qualities of the heart — compassion, generosity, idealism," observes A. David Silver in his new book, *The Entrepreneurial Life* (John Wiley & Sons). Silver maintains that it is "virtually impossible to be a successful entrepreneur without heart."

Balsillie took his first step into business by becoming a subcontractor at a major West Coast bank. Within a year, he employed 10 subcontractors; he was also pursuing new assignments for his staff and managing them. Eighteen months later, Balsillie opened a retail outlet for microcomputer sales, consulting and service. Advanced Information Management, Inc. was a modest enterprise, but the pressures of payroll and other overhead were greater than with his former team of freelancers. "There was great anxiety at every stage . . . I found it very difficult to divide my business

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world from my personal life . . . I'd be sitting at my terminal at home and all of a sudden notice it was three in the morning."

Just as friendships were threatening to dissolve and Balsillie was feeling the physical symptoms of unrelenting stress, he decided to make a clear distinction between his professional and personal lives. He vowed not to work at home and carted the temptation — his terminal — back to the office.

Of course, stress is a factor in any job, any profession. But standing at the helm of your own business involves the anxiety of responsibility for fulfilling personal goals and then of properly managing employees' security.

Psychologist Rollo May saw any venture as a crisis of growth, where one struggles with "the choices and advances from the familiar to the unfamiliar, to ever-widening consciousness of himself and thus ever-

widening freedom and responsibility, to higher levels of differentiation." Going into business is an introspective endeavor. The patience and forbearance to assess and reassess every step of the way requires a strong sense of personal identity.

After years running on the corporate schedule, the entrepreneur suddenly finds time moves at a different pace. He is more in control of his own productivity, and the destiny of his endeavor lives within him 24

hours a day, not just 9 to 5.

Anxiety is one of the spontaneous changes most people experience when they go into business. Acknowledge it, understand it and guard against its self-destructive powers.

Marketing Challenge

Most successful entrepreneurs have already developed marketing skills. Most successful MIS managers have already tested and refined those skills through the process of presenting ideas and plans to upper rungs of management as well as to their own staffs.

Marketing is one of the most misunderstood aspects of business. Many new entrepreneurs, especially from the technical world, approach marketing with trepidation. They have spent more time communicating with a CRT on the job than developing communications skills with other people. Most perceive "marketing types" as a slick, smiling, hand-shaking, fast-talking breed.

But marketing, at its best, is a very personal, genuine approach to people. The most successful marketing staff are sensitive, open individuals. Since they put their egos on the line every day and face an unavoidable percentage of rejection from prospects, marketing people maintain a strong sense of who they are. They must make the important distinction between their personal and professional lives, since the latter is involved with constant and aggressive promotion, most of which leads to rejection.

Marketing is partly a numbers game. The more people you contact, the greater the possible successes. Marketing involves patience and persistence, rejection and reward. In using direct mail, for instance, marketing professionals consider a 10% to 15% response rate high.

Marketing people often describe

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their jobs as a series of emotional ups and downs. One representative of a West Coast consulting organization described a typical workday, which included the cancellation of a big project he had been vying for, followed by a late-afternoon call from a client he hadn't spoken to in months with a lucrative consulting assignment.

The top-notch marketing professional is rare, but the DP entrepreneur must find one. Marketing is the glue that enables the pieces of a new business — the great idea, the talent, the venture capital and the fertile market — to meld into a successful operation.

Administrative Demands

Almost immediately, through contact with vendors, suppliers, clients and employees, the entrepreneur must flex the muscles of a manager. One businessman described his managerial approach as establishing a set of motives that create a stake in the venture's success for each individual associated with him. Bonuses or percentages go a long way toward creating incentive. Many businesses divide a percentage of stock among key employees when they go public.

Transferring the excitement of your vision to others includes them in the process of building a new business. Beyond money and benefits, people want to participate in creating quality and success.

The parable of the two medieval bricklayers applies perfectly here. One man, when asked what he did for a living, answered, "I lay bricks." He was unhappily resigned to a life of hard, manual labor. But the second bricklayer said, "I'm building a cathedral!" His kind of spirit and enthusiasm increases productivity.

Maintaining Control

One of the growing number of women going into business for themselves is Jan Sutchter. The former statistical analyst for the U.S. Department of Agriculture started Data Handlers a year and a half ago with a fellow USDA employee. The company operates out of Sutchter's Berkeley, Calif., home.

Data Handlers completes small statistical projects for large corporations. The business began on the basis of contacts Sutchter established through the USDA and private consulting firms. Now three to four steady clients keep Data Handlers going throughout the year.

Sutchter wants to control the volume of work she takes on. Her vision does not include expansive offices, legions of employees, prestige stock offerings or exotic deals for venture capital.

"At first I found the lulls in business hard to adjust to," she admits. "But I look forward to them now. The whole nature of the business is up and down. We would be overloaded with work and then nothing. But something always came up."

'One businessman described his managerial approach as establishing a set of motives that create a stake in the venture's success for each individual associated with him.'

Sutchter attributes the success of Data Handlers to the restraint she and her partner have exercised in not

overbooking projects.

Sutchter's programmer husband Steve predicts a proliferation of cot-

tage industries within data processing as the industry grows and more people with little or no venture capital enter the entrepreneurial fold. Bank loans are becoming easier to get. Others may choose to finance their venture by contracting for part of the year and working on a product during down times. Software publishing houses are sprouting up all over the country, offering the range of services necessary to package and market original software. The writer

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need only create a viable, well-written package, much like a novelist whose overhead costs are minimal.

Ultimately, a successful business is the result of a very personal vision. Books abound on how to be an entrepreneur, but until you begin, all is speculation and daydreams. Before you decide to be another Ross Perot or Gene Amdahl, consider the following:

Define your own concept of success. Get a handle on it before you go

into business. While the definition will probably change, it will serve as an initial anchor, a stabilizing force, a frame of reference.

Different expectations color the very meaning of "success" in business just as they do in all other aspects of life. To John Mullen, it meant developing a product from concept to commercial acceptance. To Carl Balsillie, it meant putting a service and sales organization of quality together to generate and

maintain a certain volume of business. To Jan Satcher, it meant developing a small clientele, keeping the volume of projects to a minimum and doing the best job possible. To Salvador Dali, "Success is receiving checks."

Be realistic. As writer Robert Wieder suggests, "Upward mobility propels us inexorably to that exact level of our own incompetence where we languish." Take a good look at yourself. Do what you do

best, and relegate other aspects of the business (marketing, financial administration, design, production) to others more skilled than you.

Avoid perfection. Rather, avoid the temptation of striving for unattainable perfection. As a meticulous technician, John Mullen discovered the obstacles perfection posed for his business: "You still have to be tenacious, but you have to take a larger view ... to understand that you don't put out a perfect Cadillac your first release because it will never hit the market in time and everybody else will run over you. But at the same time, you have to do something of enough quality so that you are respected down the road ... It's a juggling [act]."

Research your market. A recent *Venture Magazine* study reported more start-ups in the last few years than ever before in the computer industry and warned: "One result of the new competition is that entrepreneurs must target increasingly narrow market niches to gain a toehold, and they usually have less time in which to do it."

As the industry matures, today's toehold may turn into tomorrow's major market. A business plan can be one of the most effective tools for keeping a business on a steady track.

The entrepreneur's life is not for everyone. Setting up and running your own business are hard work and a gamble. Many failures go into building a successful operation. The good news is that success is not controlled by unknown forces.

About the Author

Gene Knauer is founder of *Peopledata*, a firm in Berkeley, Calif., that presents seminars on microcomputing to nontechnical consumers in fields such as real estate, teaching, journalism and graphic design. Knauer was formerly marketing director of Knauer Computer Consulting in San Francisco.



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SPECIAL REPORT

Computer Graphics: Charting New Directions



Edited by Bill Laberis and Jim Bartimo

July 25, 1983

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Determine Needs of Audience First

Pointers for Effective Graphics Presentations

By Peter Mitchell
And Stephen Struk
Special to CW†

The often-stated rationale for the use of graphics is that a picture is worth a thousand words. However, this statement has wide limits based on the audience and the purpose for

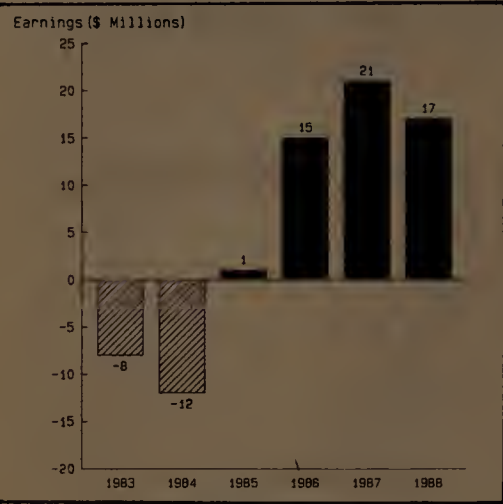


Figure 1

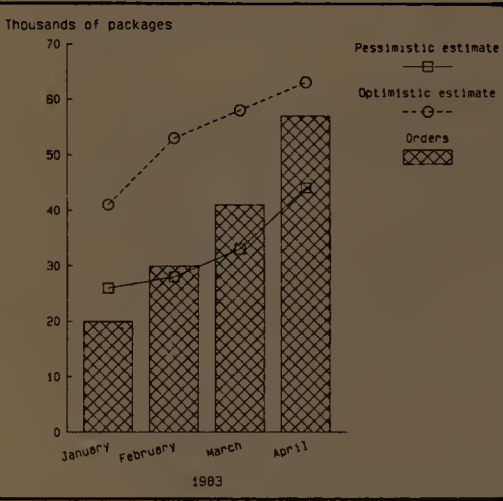


Figure 2

Projected price earnings and ordering information shown with graphics.

which the presentation was designed.

Presentation graphics are intended to support a position or sell a viewpoint; data graphics are intended to invite the viewer to explore the informational content of the data.

Audiences may be stockholders, managers, workers and students. Each audience will be optimally influenced by a different style or level of presentation, which may be dependent on the expectation of the message to be received.

For example, a three-dimensional graphic may be inappropriate for an overview presentation to senior management, while its transformation to a simpler representation might not be appropriate for an audience of mathematicians.

Once the level and the needs of the audience are fixed, the extent to which the content is to be covered can be set. The length of the allowed presentation and the amount of information are important. In a yearly presentation to the board of directors, a great deal must be presented in a short period. That period may be further compressed on very short notice.

This requires having a flexible set of alternative presentation graphics, from the comprehensive to the bare essentials. Be prepared to deviate from the planned graphics sequence. Some of your visuals are more important than others.

Many graphics formats are available. For the same type of comparison, several formats will work. The choice depends on the purpose of the presentation, the audience, the standards, the appearance and the data.

Bar charts are used to represent data for discrete units, such as years, divisions or products. Figure 1 is an illustration of good use of the bar chart. The up-down arrangement of the bars is congruent with the viewer's perception of profits (up) and losses (down).

If data for each unit has several components, stacked (also called segmented or subdivided) bars can be used. Pie charts are an alternative for

this usage. Line charts are used for continuous data or larger discrete data sets or to plot many series on the same chart. Styles can be mixed, as in Figure 2.

This graphic clearly shows that orders were initially slow, making the pessimists look good. But they have risen quickly in March and April. The clean visual impact should make the viewers (expect for competitors)

(Continued on SR/4)

Assessing Needs Is First Step To Choosing Application

By Carl Machover
Special to CW†

Computer graphics is great . . . undoubtedly it will make my life better, increase my health, wealth and welfare . . . but how do I decide what I need?

Considering that there are probably more than 300 suppliers of hardware, software and systems, with an enormous range of price and performance, this type of confusion is understandable.

The basic concept to remember is that there is no one best device or technology to match all applications.

The first task, then, is to understand clearly the requirement . . . or application profile. Once that is established, begin matching the available devices (or technology) against that application.

The typical application-depen-

dent characteristics to consider and prioritize are many, and the major ones will be reviewed here.

Note that the topics are alphabetized, not prioritized. The priority will depend on your own particular application.

Color vs. Monochromatic. Is color absolutely needed, as in many art, animation and process control applications? Or is color simply desirable, as in business graphics and many engineering applications . . . or, in fact, not wanted at all, as in some medical and business applications or where the user perceives color to be an unnecessary extravagance?

Further, how many colors or gray levels are needed?

An enormous number, such as 4,000 in some imaging and art applications, or a large number, such

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*Key: Proper Implementation of Graphics***Seven Characteristics of Successful Installations**

By Alan Paller
Special to CW†

Why would two organizations of approximately the same size with the same size computer and the same size graphics software be having very different experiences with computer graphics? Why would one organization have fewer than 15 users while the other has nearly 500? And why do the applications of computer graphics in the first company have a low payoff while those in the second company contribute directly to the bottom line?

The answer to these questions is that one of the companies implemented computer graphics correctly and the other one did not. A review of these and 10 other companies with computer graphics installations uncovered seven characteristics of successful installations that were missing in whole or in part in the unsuccessful installations:

1. Access to Both Hardware and Software. Successful installations nearly always allow their users to request charts from alphanumeric terminals and communicating word processors, as well as from graphics terminals. They have graphics output equipment that is available as a shared resource so any user of any terminal can have slides and paper charts created. Only when a user has developed a high-enough volume to justify equipment purchase is he forced to acquire graphics terminals, plotter or film recorder equipment of his own.

In addition to hardware accessibility, a successful installation offers software accessibility, which means that the software is easy to use by nonprogrammers, and it offers function accessibility, which means that its users can get all of the types of charts they need, not just a few of the ones that were predetermined by some programmer.

2. Linkages to Data. The most successful applications of computer graphics have prospered in part because people at those installations have developed linkages between important data bases and graphics capabilities. Some of those linkages are from files, but more often the linkages are from data analysis packages, from data base management systems and even from printouts.

This last point deserves some explanation. Many organizations have reliable old applications of computers that produce weekly or monthly reports. A common example is the accounting system. To make charts from the data that is contained in those reports, one needs a link between the report itself and the graphics package, because many of the financial application programs are inaccessible. To solve this problem, the data base linkage should include a capability for reading and decoding print files that are created by other application programs.

The data base linkage seems to need one additional feature: a data manipulation capability to aggregate, project or otherwise analyze

data that is going into the graph so that the graphics facility can respond to the user who wants to "just make a couple of changes" without going all the way back to the data base.

3. Chart Books. Successful installations nearly always have collections of charts predesigned. New users look through the designs, pick a chart that they want, fill in the data they want to show and get a first draft. Then the user will ask for changes in the chart, and the chart-book system should be able to accommodate all design changes that the

user wants, such as multiple charts per page, extra labels, differences in colors or patterns and so forth. The best chart books are the ones designed inside the corporation, usually with the participation of both the final end user and the graphics department. Often multiple chart books are developed for finance, engineering, sales and marketing.

4. Training. An effective training program is regularly scheduled, given at least once a month and includes at least 50% hands-on time. It is often broken into two or three segments of

one-half-day or one day each.

5. Technical Assistance. Successful companies have excellent technical assistance groups who are more committed to the end users meeting their needs than to data processing dogma. They help build data base linkages, and they help teach the courses. But most important, they give a helping hand to new users who want to get started and do not know which buttons to push.

6. Include Microcomputers. The most successful implementations
(Continued on SR/4)

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Some Suggestions for a Successful Installation

(Continued from SR/3) generally have microcomputers involved in their graphics facilities in two ways.

They have a support facility that demonstrates microcomputers on a stand-alone basis that includes any of 50 to 100 software packages on the market.

The micro can preview charts that are to be produced on high-quality devices connected to the mainframe.

7. Get the Best Software and Keep It Up to Date. Software constrains the value of your hardware. If you install software that does not have flexibility, quality and power

as the interface between your users and the computer graphics hardware, you can-

not expect the graphics facility to support the users' needs.

Paller is president of AUI Data Graphics in Washington, D.C.

Tailor Graphics to Your Audience

(Continued from SR/2) excited about seeing the data for May.

Beyond bars, pies and

lines and their variations are star charts, Gantt charts and charts drawn with cowboy hats and faces. Each has a

place in presentation graphics. One use, to be employed occasionally, is to present the key point in some unusual but appropriate style.

Legibility of graphics is important. The best chart is useless if the audience cannot see it. It is better to err in the direction of visual simplicity than visual complexity. Consider both the lettering size and the number of components on the chart as well as projection size.

One heuristic is the six to one rule; for each one foot screen width, viewers should be no more than six feet back. This type of chart has many components, and the fastest growing segments fight for attention with the more static segments at the ends.

The use of color is a double-edged sword. Color can greatly assist the processing of visual information. Color highlights important information and differentiates areas or lines on a graph. Because colors can attract attention, they add an extra dimension of encoding along with size, shape and width.

Color has its drawbacks. Five to 10% of the population is color-blind in some form; the use of color can obscure the message for some key viewers. Too many colors on the same graphic cause visual clutter, information overload and degraded viewer performance. Six to eight colors should be a maximum.

A recent experiment using multicolored graphs found that users overestimate the size of high-saturation red areas.

The complexity and illusions associated with color are viewed by many as having only a distracting or even falsifying effect. Color is overused, but don't ignore its value.

Graphics production has been facilitated by wider availability of computer-based software packages and cost declines for plotting equipment. Stand-alone graphics systems and mainframe packages have become familiar adjuncts to graphic arts departments.

Struk is a human resources consultant for Mobil Corp. in New York. Mitchell is president of his own human factors and systems design consulting firm, Ergo Design of Weehawken, N.J.



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By Hoo-min D. Toong
And Amar Gupta
Special to CW†

Specialized Packages

Only the personal computer is dedicated to the individual in a business environment. It is able to satisfy individual tastes, tasks and curios-

Managerial information involves a complex aggregate of related pictures, graphs, text and numbers. At present, business personal computers only represent data in numeric form, in text and in limited simplistic charts and graphs. However, what is missing is the critical ability to pre-

Pictures quite obviously possess

Several vendors claim to offer such software to run on personal
(Continued on SR/8)

[illegible]**VISUAL 500/550**

Which Graphics Application Is Right for You?

(Continued from SR/2)

as 256 in solid modeling applications, or a few, such as 16 in many engineering analysis and business graphics applications?

Data Content. How complex are the images to be shown? Do they consist of many (more than 30,000) short line segments, for example, (as in many engineering drawing/design applications) or relatively few (as in many data representation applications for use within the department)?

Is any flicker acceptable when a complete picture is displayed, or must there be no perceptible flicker?

Dynamic Capability. Do your images need to change in real-time, or near it, as in simulators, or can you tolerate relatively slow changes and updates, as in many data representation applications?

Do you need local graphics elements, graphics functions or application processing capability to ensure adequate user response?

Picture Quality. Is a realistic representation of the real or simulated world needed, as in animation and solid modeling?

Or is a schematic representation adequate, as in process control and documentation?

What line quality is acceptable in the images?

Must curves, off-verticals and off-

Color was once considered an expensive frill for many graphics applications. Today, you can buy color raster bit-mapped terminals for the same price as storage tubes . . . And in some cases, the cost per color copy is less than the cost for black-and-white copy.

horizontals be truly smooth, as in presentation slide applications, or are the "jaggies" acceptable, as in many peer business graphics applications?

Response Time. Must the system respond in real-time to an inquiry, as in flight simulation and drafting applications? Or will you tolerate some delay, as in some analysis applications?

Software. Are you an end user expecting to use the system to solve a specific application problem, such as computer-aided design and manufacturing or financial analysis? Must the software supplier furnish all tools, including the user application interface, so you can proceed without additional software effort? Do you need compatibility with some existing software on the system? Alternately, do you want to provide for machine or graphics device independence

with a possible compromise in performance?

What local resources will run the software package?

Will it, for example, run on a mini or a micro?

Price. In the real world, price is always a consideration. Today, computer graphics displays, hard-copy devices and software range in price from under \$1,000 to over \$100,000, and turnkey systems range from a few thousand dollars to almost a million dollars.

Therefore, price almost always represents some compromises since one is usually operating within a budget.

It should be pointed out, however, that conventional wisdom keeps shifting concerning what you can do within a specific budget.

For example, color was once considered an expensive frill for many graphics applications. Today, you can buy color raster bit-mapped terminals for the same price as storage tubes.

You can buy color hard-copy devices for the same price as black-and-white hard-copy devices. And in some cases, the cost per color copy is less than the cost for black-and-white copy.

Real-time, solid-shade image generation and manipulation has historically been a multimillion dollar

affair.

It is quite possible, however, that products costing less than \$200,000 will soon be announced. So keep testing the price/performance assumptions.

User Environment. What range of operator input devices do you need?

Will the operator be an experienced typist, or will the operator be intimidated (or offended) by the need to use an alphanumeric keyboard?

Will you operate in an open or closed-shop environment? Must you have menu capability, available with function keyboards, graphics tablets and light pens?

How about cursor control devices such as the mouse, joystick, trackball, thumb wheel, and/or pressure pads?

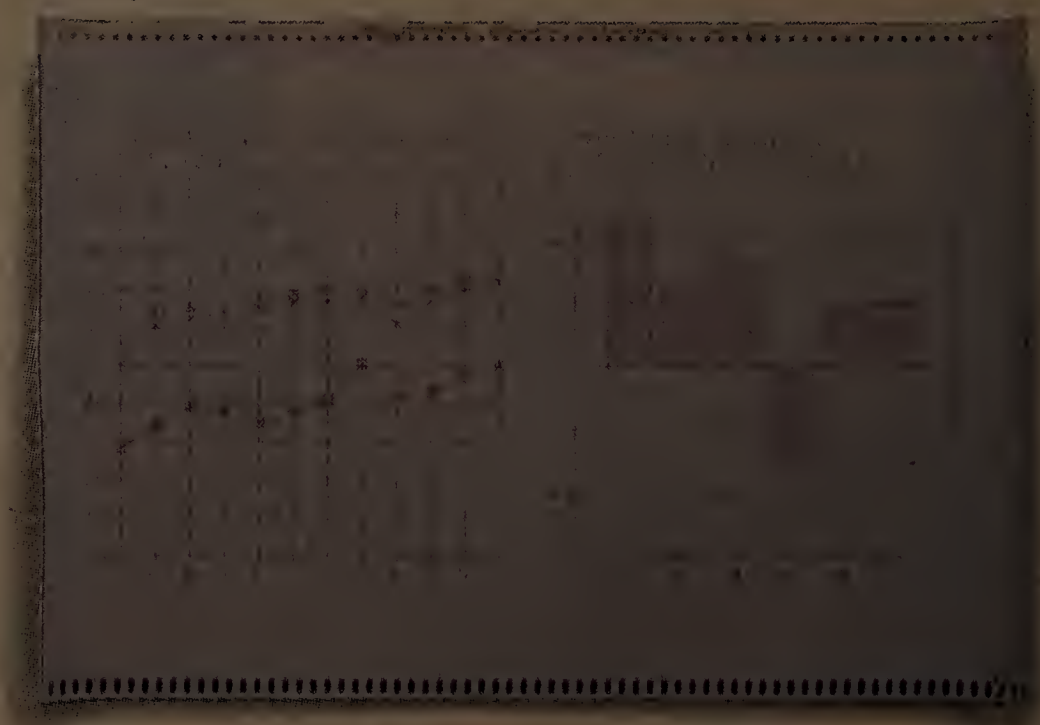
If micros look like an attractive possibility, does the company allow them?

Can you get access to the company's mainframe or data base? Is that important in your application?

Brief articles like these often raise more questions than they answer. As someone once told me after a seminar, "Before I came, I was confused. Now, I am still confused, but at a higher level."

Machover is president of Machover Associates Corp., a graphics consulting firm based in White Plains, N.Y.

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*But Debate, Detail Work Continues***Headway Being Made on Graphics Standards**

By Dave Straayer
Special to CW†

For the past decade, the computer graphics community has been involved in numerous attempts to define computer graphics standards.

The establishment of graphics standards benefits users and manufacturers of graphics products by protecting software investments and increasing programmer productivity. Software investments are protected because it is easier to utilize new graphics technology when it meets standards. Programmers are more productive when fewer new concepts and skills must be learned to utilize different hardware.

After a number of false starts and some duplication of effort, computer graphics is finally getting standardized. The American National Standards Institute (Ansi) and the International Standards Organization are in the process of adopting the Graphical Kernel System (GKS) as a standard for computer graphics.

Meanwhile, task groups within the Ansi X3H3 technical committee on graphics standards are furiously working on other standards proposals: Programmer's Hierarchical Interface to Graphics (Phigs), Virtual Device Metafile (VDM) and Virtual Device Interface (VDI).

It may seem that these other proposals would conflict or compete with GKS, forcing vendors and users to live with multiple standards. In addition, several other standards that also appear to address computer graphics have been discussed in the trade literature. These include Core, North American Presentation Level Protocol Syntax (NAPLPS) and Initial Graphics Exchange Standard (Iges).

GKS is an applications software standard for use in drawing pictures with computers. It is primarily a software standard, a standard subroutine package for graphics.

Refining and Extending

Ansi X3H3 is in the process of refining and extending GKS to solve some related problems. Standards for devices, communications protocols and pictures files are all required by many computer graphics users. The strategy is simple: Since it takes a long time to create and adopt standards, Ansi begins by standardizing a well-known and understood part of graphics, and while that standard is being finalized, it proceeds to address other concerns and questions.

For example, the GKS document itself states the intention "... to serve manufacturers of graphics

'After a number of false starts and some duplication of effort, computer graphics is finally getting standardized.'

equipment as a guideline in providing useful combinations of graphics capabilities in a device." But GKS is a software standard, so this type of "guidance" is fuzzy.

Operating under Ansi X3H3, the task group X3H33 is working on a standard for computer graphics devices — VDI. Unlike GKS, this proposal is intended to standardize the commands used to draw pictures on graphics terminals and plotters.

The VDI committee is working to ensure their standard will dovetail with GKS. The commands issued by an application program to draw pictures (GKS calls) are not exactly the same as the commands sent to a graphics terminal.

In distributed graphics processing, some of the graphics work is typically done in software (such as some coordinate transformations), while other parts of the work are typically done in the graphics device itself.

GKS does not address the software

support needed by certain types of very high-performance graphics devices and consequently the needs of certain types of computer-aided design software. Such systems require high dynamics — the ability to change pictures quickly — and interactivity.

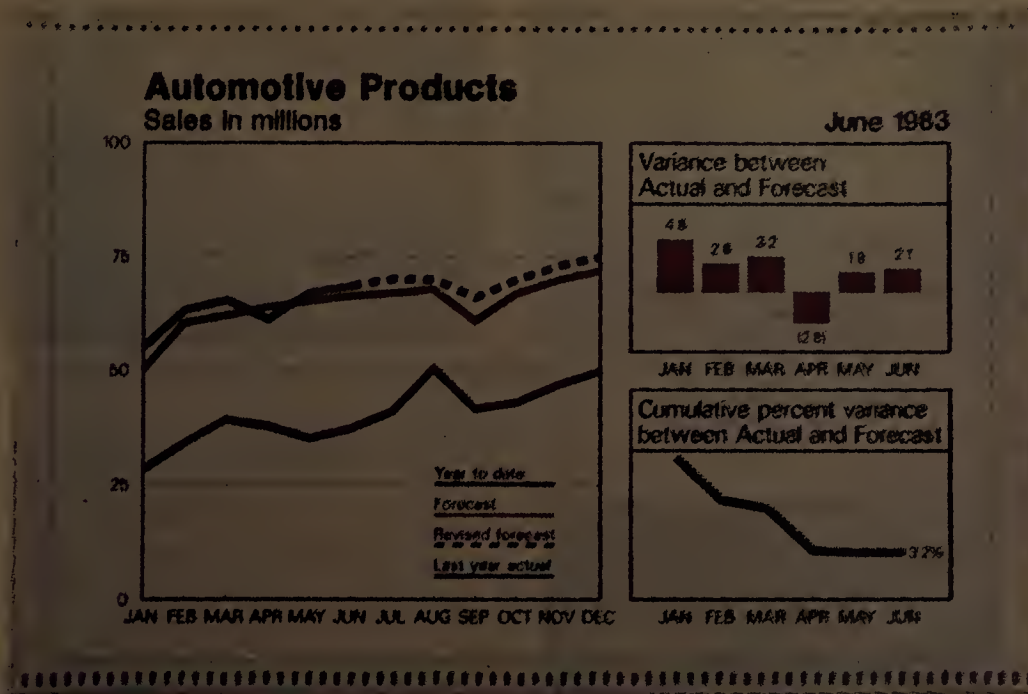
The Ansi X3H3 task group X3H31 is addressing this problem by developing a proposal called Phigs. High dynamics require a different way of looking at some of the basic tools of graphics, called primitives and attributes. There is some concern that it may not be possible for the Phigs system to be 100% compatible with GKS.

However, the X3H31 committee is taking care that the Phigs system is as much like GKS as possible. Phigs uses the same primitives (lines, text, filled areas) as GKS, and the same set of attributes (colors, dash patterns, fonts) as GKS. Phigs uses a terminology in common with GKS and will probably come to be regarded as an extension of GKS, which supports a high degree of interactivity and dynamics.

In addition to the VDI proposal, Ansi X3H33 is also proposing such a file format standard — VDM. This, too, is to be compatible with GKS.

(Continued on SR/8)

what the D.P. department company's image.

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Micro-Generated Visuals Seen Effective Link

(Continued from SR/5)
computers, but most of them fail to integrate truly the necessary processing of all three types of pictorial information.

C&H Video's Slide Show and Crow Ridge Associates' Apple Flasher are examples of inexpensive software (under \$50 each) which facilitate

generation of slides on Apple Computer, Inc.'s Apple II and store slides on disks. Among these two, only the Apple Flasher allows direct access to a desired slide. Neither of these packages allows for modification of text slides.

More expensive packages, such as Lotus Development

Co.'s Executive Briefing System on the Apple II, enable creation and modification of both text and graphics slides. The Screen Director requires the user to enter commands — an error-prone process — rather than presenting a menu of all possible options on-screen.

Lisadraw for the Apple II

is a graphics package that integrates the three types of pictorial information. Lisadraw is an important tool and would be more effective if its shadowing scheme could be translated in color. As it is, the dull black-and-white quality of the display is less provocative or memorable than even the more

primitive graphics programs. The use of simple illustrations to describe complex situations is the winning aspect of Lisadraw.

But again, the elementary illustrative capacity is not nearly sophisticated enough to sustain rapt attention, and communication is first and foremost the successful transfer of information.

Communication is the keystone of the executive domain. Being able to analyze and effectively disseminate information is a manager's critical role. Of greater importance is the ability to project immediate understanding to the group to which one is presenting information. The personal computer as a presentation medium for visual communications will considerably aid understanding of the in-depth report or proposal.

Instead of relying solely on numbers and text displayed or printed in a trivial, elementary manner, the addition of graphs and colorful, quality pictures adds an entirely new dimension to integrated information on the computer.

Toong and Gupta are researchers at the Center for Information Systems Research at MIT's Sloan School of Management.

Standards In Charts For Graphics

(Continued from SR/7)

GKS is a functional standard. It standardizes what functions are available to an application program, but not necessarily the names or calling sequences of the subroutines (or procedures) that are called on to do the drawing.

NAPLPS is a standard for videotex, which is essentially a way of connecting television sets (or similar display devices) to telephone lines (or similar communications networks) for public access to textual and graphics data.

Iges is now a part of the Ansi Y14.26M-1981 standard for Digital Representation for Communication of Product Definition Data. Iges is a way to store design data, which can also be represented by pictures.

Iges files contain more than just picture information. They can include materials specifications, tolerances, part numbers and other data.

Straayer is a systems engineer at Tektronix, Inc. in Wilsonville, Ore.

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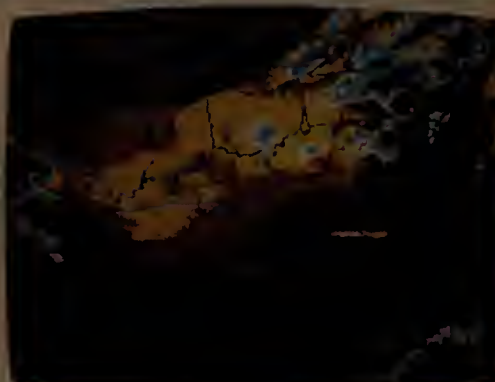
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Graphics Seen Effective Tool For Handling Data Overflow

By Marshall R. Hatfield
Special to CW†

As a child, one of my favorite stories was "How the Sea Got Salty." It told how the owner of a magic salt mill was able to grind out unlimited quantities of salt, then a source of wealth. One day, the magic word that turned off the salt mill was forgotten. Salt spewed out of the mill uncontrollably and eventually filled the oceans.

This story describes a situation similar to that encountered by today's managers. Thanks to the widespread use of computers, great masses of data are being compiled. Managers report that they are drowning in oceans of paper. Every day, multipaged, computer-generated reports on inventories, market share or cash flow land on some manager's desk.

The three basic problems raised by this plethora of information are: how to assimilate and interpret it, how to use it effectively in decision making and how to share the data with others to achieve consensus and decision.

How can overloaded managers take in all of the available information? How can managers best use the information to spot trends and comparisons, test "what-if" scenarios and see the relationships between past, present and projected performance?

Bobbing between the columns of computer-generated statistics, flipping from one printout to the next, the manager does not find his productivity increased simply through the production of data.

Increased Productivity

In recent years, computer-generated graphics for business has emerged as one answer to managing the information glut. Presented in encapsulated form, relevant data can then be used in the decision-making process. I have seen one case in which the use of computer-generated graphics enabled a corporation to reduce a monthly 100-page report to one sheet of graphs. The information was made instantly accessible. This had to result in increased productivity.

After all, it is the ability of managers to make better decisions and make them at the right time that results in increased productivity.

The use of such computer-generated graphics has become a reality for more organizations as the cost of hardware has declined and software has become increasingly available. It is obvious that the field of computer-generated graphics is growing. Some industry analysts predict that by 1985 the field could generate annual sales of almost \$5 billion and grow by 35% each year during the '80s.

However, growth in the use of computer-generated graphics for business cannot be viewed in isolation. Increasing use of such graphics depends on a variety of technologies that will either support or deter its growth. These technologies range from data base management to semi-conductors to the actual display and

use of the graphics themselves.

The recent widespread availability of color, for example, has stimulated interest in computer-generated graphics for business meetings. Color has been shown to add visual interest and increase readability. Today, a color CRT terminal is available for a little more than a black-and-white terminal.

Color computer-generated graphics can be produced in several ways. Options include stand-alone computer systems that store, analyze and

(Continued on SR/12)



An overhead projector allows graphics to be shared in business meetings.

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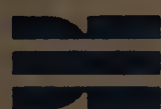
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Taming the renegade p.c.

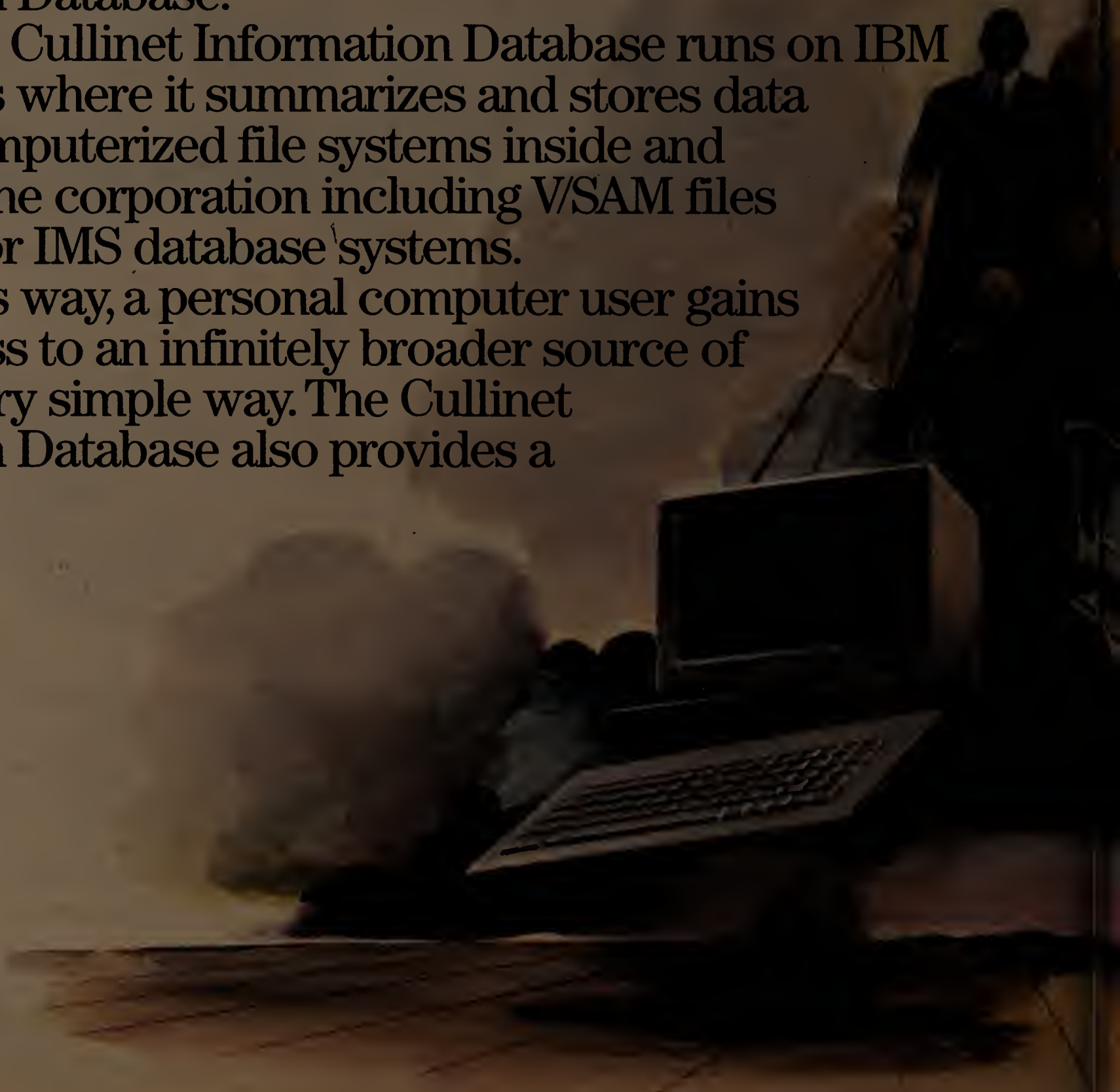
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The answer is software.

And software is Cullinet.

Army Tank Unit Keeps on Track With Graphics

By Peter Hunt and Pat Watkins
Special to CW†

One of the primary missions of the Procurement and Production Directorate of the U.S. Army Tank and Automotive Command (Tacom) is to analyze and negotiate contracts for tracked and wheeled vehicles for use by the armed forces. To perform its mission reasonably with the available resources, it needed to generate pictures of both historical and projected computer-manipulated data.

Tacom was able to put together hardware and software to generate pictures that served two purposes: to inform senior management of the re-

lationships among specific cost elements in contracts and to convince contractors of the validity, reasonableness and accuracy of government analysis and negotiating positions on

future trends and projections in contrast to their own.

Keeping senior management informed is a vital element of operations in any organization. In the past,

preparation of charts and pictures for a briefing would take up to 20 man-hours. During the course of each briefing, suggestions would be made
(Continued on SR/14)

Graphics: One Answer to the Info Glut

(Continued from SR/9)

display data in graphs and charts. These are then translated into transparencies and slides by output devices, such as plotters, for use in meetings. In existing computer systems without graphics capabilities, data can be reformatted and convert-

ed to computer graphics through the use of a custom translation program.

Still another option is composing a graph on an in-house computer, recording it on a magnetic disk and transmitting the recorded information by telephone to a photographic studio. There it is made into slides,

transparencies or prints.

Whatever new developments occur in the computer graphics field, communication between people is necessary for the decision-making process. For most of us in business, word-of-mouth communication still remains the way we most often transmit information. Much of this communication takes place in meetings. Various studies have indicated that managers spend up to 60% of their time each day in meetings.

Visuals, such as computer-generated graphics, can be used to increase the efficiency of information sharing in meetings. It has been estimated that we retain only 10% of what we hear. By using visual aids in meetings, the retention rate leaps up to 50%.

Concerned with finding ways to increase managerial productivity, the 3M Co. funded a study that was conducted by the Wharton School at the University of Pennsylvania in 1981. The study focused on the overhead projector as a tool to make better use of meeting time and to achieve quicker and more informed management decisions. The study compared meetings in which the leader used an overhead projector to meetings in which no overhead projector was used.

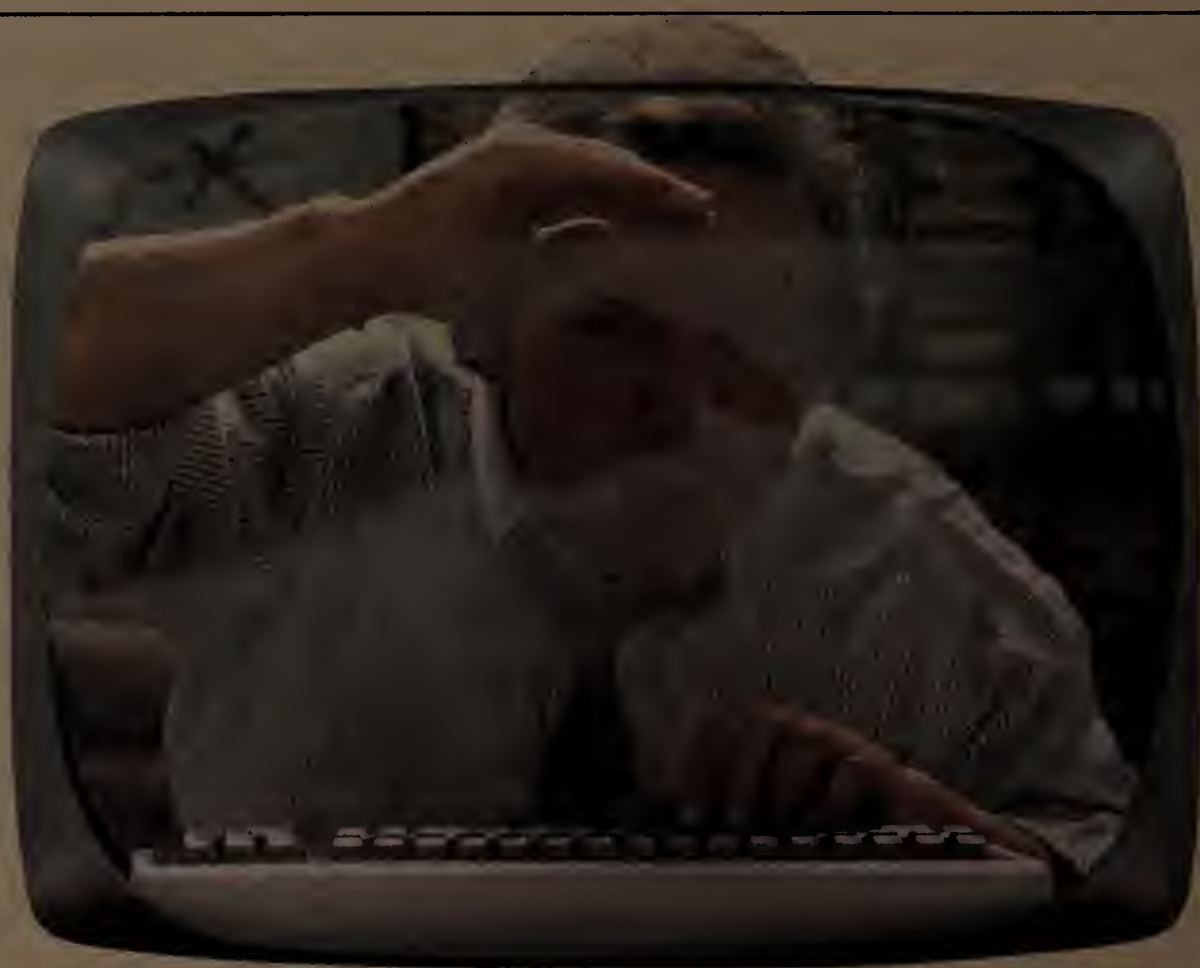
The study showed that the use of an overhead projector resulted in a perception of the speaker as being more persuasive, more credible and more professional. Consensus was reached more quickly and made for shorter meetings.

The use of an overhead projector, for example, resulted in a 28% reduction in meeting length. Such a reduction could produce an hourly savings for American businesses equal to several billion dollars a year. The 28% reduction could also be translated into a time savings of 42 extra working days per year for the average executive.

The study also revealed that when overhead projection was used, a larger percentage of participants (64%) reported that they made their decisions immediately after the presentations were completed. Similarly, when overhead projection was not used, 52% reported that they delayed decisions until after the group discussion following the formal presentations.

Today, computer-generated graphics is used overwhelmingly for management presentations. These high-quality graphics can clarify complex relationships and reduce the level of ambiguity. In most instances, graphics generated by computer take on traditional formats, but a wide spectrum of graphics formats is available.

Hatfield is the vice-president of 3M's Audio Visual Division.



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Firm's Use of Graphics a Gradual Evolution

SOUTH CHARLESTON, W. Va. — How does a company implement computer graphics when a corporate group provides computer services to all areas of the company?

At Union Carbide Corp., the process began almost three years ago when there were less than a dozen

computer graphics applications on the corporate IBM computers. It involved a phased implementation of computer graphics at the two corporate data centers and the coordination of people and activities across the various areas of the corporate computer services organization.

The process has not been completed yet, but the use of graphics has grown from 20 graphics users per month to over 250 users per month. Use of computer graphics is continuing to grow as more users acquire graphics devices.

Union Carbide maintains two IBM

data centers that provide computer services to over 100 company locations in the U.S. The service is used by groups whose responsibilities include sales, marketing, research, engineering, plant operations and business analysis. To provide these services, the corporate computer services organization consists of at least 250 people supporting operations, system software and telecommunications as well as over 300 people providing applications development and support.

The introduction of a computer graphics service was consistent with a decision to be proactive in meeting the needs of Union Carbide's internal users. A person within the applications development group who had previous experience with computer graphics was named the computer graphics product coordinator. She was responsible for developing a comprehensive plan for what needed to be provided.

Since no special group was formed to support computer graphics, she also coordinated the efforts of people in other parts of the organization who had special skills needed for implementing the graphics product.

Rather than try to offer a full-blown computer graphics product initially, a phased approach was used to implement the graphics product.

(Continued on SR/16)

Army Division Saves Time With Graphics

(Continued from SR/12)

to improve the quality of the presentation through adjustments to the charts and pictures. These modifications, however, would require the same amount of time and effort as was needed for production of the originals.

The need for an easy-to-use, flexible, powerful pictorial package was one of the requirements specified for the acquisition of a microcomputer. Tacom found it was able to meet hardware requirements with an Altos Computer Systems, Inc. multiuser micro system, a modified Digital Equipment Corp. VT100 terminal and a Hewlett-Packard Co. 220 plotter. Several software packages were evaluated by reviewing technical literature, and the Redding Group, Inc.'s Graftalk was selected as the most promising of the competitive candidates.

Through the use of computerized

preparation, the time needed to prepare the necessary charts and pictures was reduced to 25% of the original man-hours. The modification time was reduced even further since Tacom was able to save the software commands and data used to make a chart, recall them from storage, change and then reprint them with the revisions made.

Convincing the Contractor

It is a difficult job to convince a contractor that the number of direct or indirect labor hours or the proposed price for a specific product is not reasonable. Tacom found that the technique that works best is to use engineering formulas to project needed data and then to display this data on paper.

Since most negotiations with contractors take place over a period of time, the ability to update, reproject and redisplay the data is vital.

During the last set of negotiations, Tacom had to learn how to use the hardware, how to use Graftalk and how to prepare the charts. It was successful in both learning the basic uses of its system and in its dealings with the contractor.

The ability to display data in pictorial form has been around for centuries. The manner in which these pictures have been generated has remained essentially unchanged for a large part of that time. In the last 10 years, however, the use of computers to display pictures has been rapidly making the old ways obsolete.

Even with these new techniques, it remained true until recently that one needed not only very expensive hardware and software, but also some very high-priced talent to manipulate all the equipment and data needed to generate a picture.

Hunt and Watkins are members of the U.S. Army Tacom in Warren, Mich.

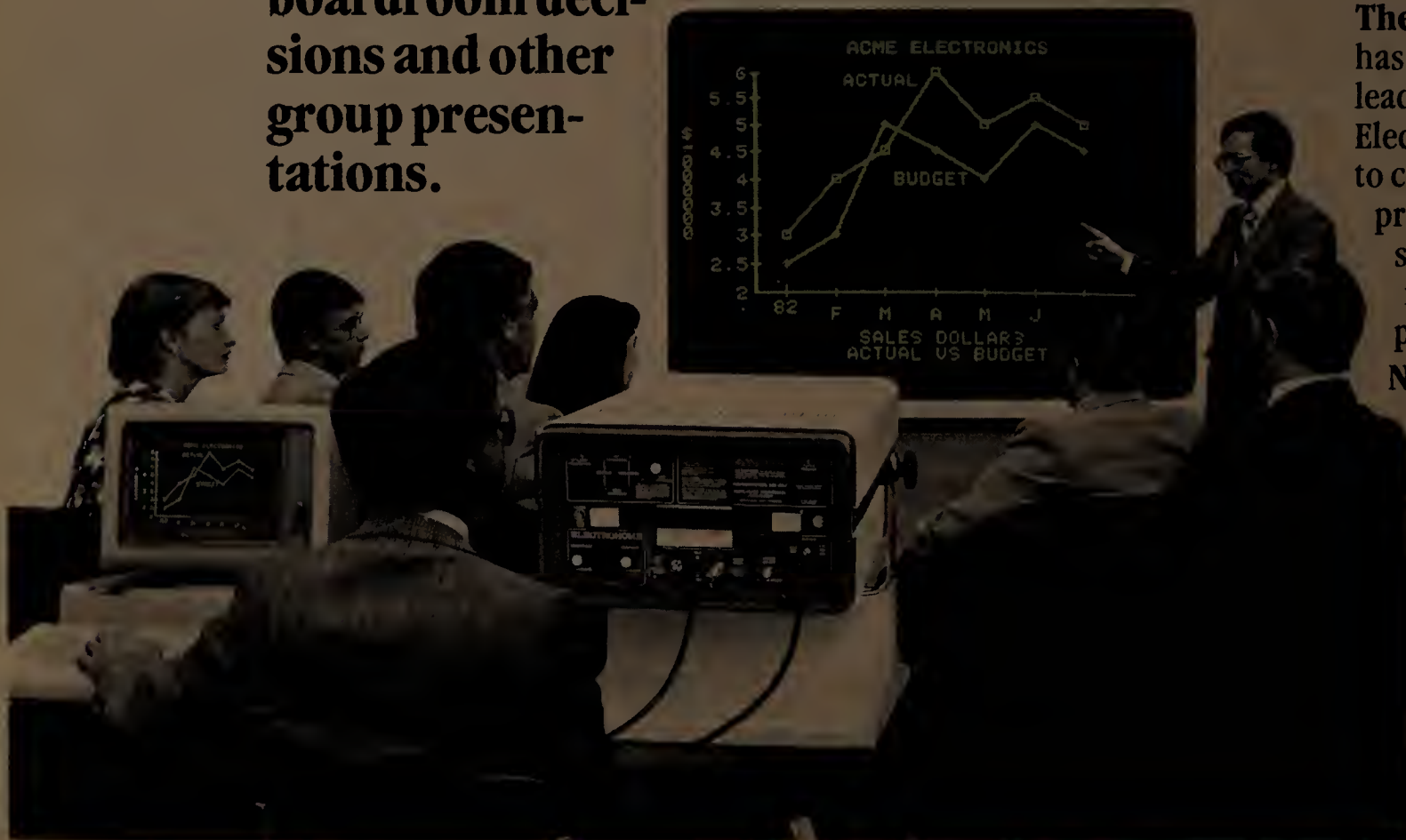
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Finds Room for Improvement

A User's Search for 'Ideal' Graphics Software

By Elizabeth F. Young
Special to CW†

One would think that a color junkie like me would be easily impressed by the multicolor menus in a graphics program. But an indiscriminate use of color by one software developer forced me to disconnect my color monitor altogether.

I didn't mind the multicolor graphs in the morning when I began plotting a long series of graphs, but by the end of the day, my eyes could no longer focus on the square daubs of red, green and magenta quivering on the screen. Vibrating white hieroglyphics drifted in a sea of blue inverse fields.

Stirring from this color-induced stupor, I phoned the software developer. I thought maybe they could change the menus to a nice, soft green. On the other end of the line, the programmer emphatically said, "Studies indicate that people like blue. It is a restful color."

He didn't seem to notice that my voice had become a little hysterical, as I heatedly replied that I was staring at the blue inverse fields at this very moment, and my eyes were about to fall off my face.

This prima donna programmer was not at all eager to change those nifty colors to a dull, uniform green.

'The instant graph generated by a microcomputer is appealing, but unless a program can deliver what is needed by the user, it will remain a tempting gimmick, not a professional working tool.'

After my unsuccessful attempt to convince him that, as a user, I had a valid criticism, I hung up the phone and disconnected the color monitor. I plugged in the black-and-white monitor and, with grim satisfaction, watched the green menus and monochrome graphs appear on the screen.

The "instant" graph generated by a microcomputer is appealing, but unless a program can deliver what is needed by the user, it will remain a tempting gimmick, not a professional working tool. In the process of charting hundreds of graphs for strategic planning presentations, I found that I required specific options that my particular software did not offer.

This led me to research other software that might meet my needs. From a set of stock queries to different software houses about their products, I arrived at some criteria for the "ideal" business graphics program.

Charting options should include the capability to plot pie, line, bar, stacked bar and scatter charts. Additional options for text charts and shapes, triangles and squares that can be filled with color or text should also be included. The same data can be plotted in different chart types without switching disks or starting over. A mixture of lines, bars or scatterers can appear on the same graph.

Optimally, the image on the monitor would be as clear and sharp as the plotted graph. At this point, the graphics display is much cruder than the plotted hard copy.

'Good visual images are preeminent in graphics software, but documentation is also an important component.'

I purchased a color monitor in order to display graphs and make modifications before plotting. At first, my graphics package did not display the graphs in color, but I was assured that a "color update" was on the way. I had to send the disks to the developer and pay a fee for the update.

After several weeks, the disks were returned to me. I flashed a

graph on the screen, expecting to see a stacked bar in six brilliant colors. What a disappointment to find that I was restricted to a total of four colors. Initially, I thought the software was deficient, until I learned that the IBM Personal Computer color graphics board allows for the display of only four colors at a time.

The four-color limitation has been rectified by the introduction of color boards that display 16 color combinations. But even with various program enhancements, a 16-color board and a high-resolution color monitor, circles and curved shapes appear with jagged edges on the screen. If you shoot a 35mm slide from the monitor, the image will not be substantially improved, and you may be better off making a slide from the plotted hard copy.

Good visual images are preeminent in graphics software, but documentation is also an important component. If two or three graphics programs offer basically the same features and the documentation is superior in one, that is the one I would buy. A user manual that is poorly organized, confusing and misleading is a liability.

The documentation should be clearly separated into explicit sections. (Continued on SR/20)

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Phased Approach to Implementing Graphics

(Continued from SR/14)

The first phase was aimed at providing the minimum support needed for supporting computer graphics while also providing a firm foundation on which to expand the product.

The second phase was targeted at providing all major pieces needed to offer computer graphics support for both batch and interactive applications, but without addressing the area of highly interactive computer graphics. The implementation is currently approaching the end of the second phase.

The third stage will involve maintaining support for existing capabili-

ties as well as responding to advances in technology that address the needs of the end user.

Although using a phased approach simplified the implementation, it was still necessary to break down each phase into a number of tasks involving several specific areas, including: telecommunications, training, operations, user support, general-purpose software, marketing, hardware, coordination and applications.

In many cases, the activities in one area could proceed independently of those in another area. Within a given area it was important to use the same

people on graphics activities since these people were developing an understanding of computer graphics and how it related to that area.

However, in a large organization specialization is the norm and a different person was often required to adequately cover each of the areas. Thus, coordination of the different activities was critical.

To assist with the coordination effort, a committee was formed. The committee consisted of representatives from telecommunications, the two data centers, the hardware/software planning groups, the two commercial applications organizations,

the scientific applications organization and the time-sharing services group.

The first stage involved the introduction of computer graphics on the new IBM VM/CMS time-sharing service being offered out of the two data centers.

The major emphasis in this phase was to offer general-purpose graphics software that would allow users to develop their own applications using any graphics hardware they already had.

The software packages Tell-a-Graf and Disspla from Issco, Inc. and the SAS/Graph procedures from SAS Institute, Inc. were installed on VM/CMS at both data centers. Tell-a-Graf was for use by nonprogrammers. Disspla was for programmers, especially those in the scientific areas, who would be developing graphics applications.

The second phase contains more diverse activities and is still under way. In telecommunications, the emphasis was on providing basic support as well as investigating hardware and protocol converters that would allow asynchronous graphics devices to appear to the user as an integrated part of the IBM environment.

In operations, a centralized graphics facility was implemented for providing 35mm medium resolution slides, transparencies and low-volume paper output.

In the software area, two additional Issco products were installed for different users. Data Connection was added for accessing data already stored in the computer and converting it for use with Tell-a-Graf. Cuechart was added for the nonprogramming user who had a minimum knowledge of graphics and whose data was not in the computer.

In the hardware area, the end users were expected to justify and acquire their own equipment. The computer services organization had to provide the graphics hardware for its own people in systems software, user support, training and applications.

In the applications area, SAS was used as the vehicle for integrating graphics into the other major VM/CMS products. An effort was made to ensure that the applications people were trained in the various software packages so they would be able to demonstrate graphics to the users.

In the area of user support, one person with computer graphics experience was added to the CMS information center at each data center.

The phased implementation approach has several advantages. The user is learning about graphics at the same time the computer graphics product is being implemented. This allows the users time to develop their ideas before they actually start to make use of the computer graphics product.

Implementing computer graphics by coordinating people in different groups within a computer services organization only works if the management supports the effort and provides the necessary funding.

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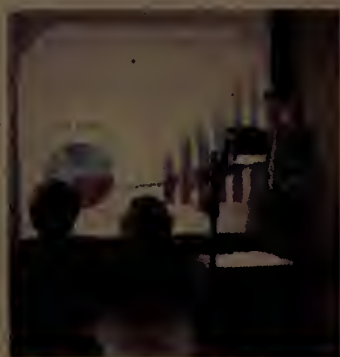
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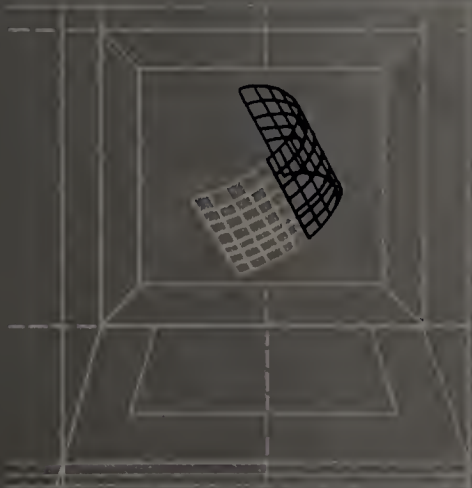
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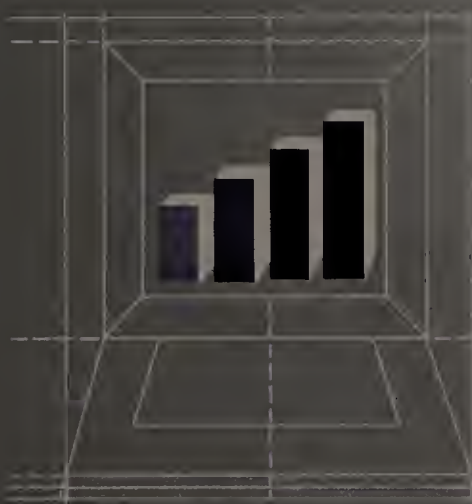
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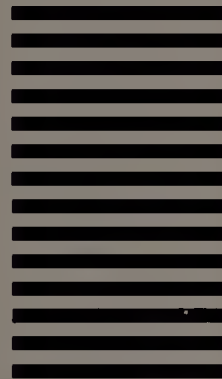
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Benefits to Both

Micro or Mainframe Graphics: Which to Choose

By Louise Bruch
And Nanci Smith

Special to CW†
Corporate America is dis-
riving the meaning of
hics. No longer is it con-
ced state-of-the-art to
dle around long columns
figures. Today, only pie
ts, bar graphs and bril-
t colors will do.

Business graphics have
an invaluable in helping
agers present financial
rmation to nonfinancial
ences, which can range
a staff-level employees to
chairman of the board.
cting from many differ-
types of charts and col-
managers can help their
iences quickly spot
ds, which might other-
e be hard to pick out if
y weren't looking at a
ph.

Instantly, people see the
ining of numbers that
meant very little in the
n of long columns of fig-
s.

But with the proliferation
microcomputers in busi-
s today, should a corpora-
a select microcomputer
phics or mainframe com-
er graphics? Or should it
the latest graphics op-
t, that of linking the cor-
ate mainframe computer
microcomputer at a man-
r's desk?

It depends. There are cer-
t costs, benefits and con-
siderations to each approach,
cluding hardware to run
software and the amount
computer resources that
needed.

Sharing Resources

With mainframe comput-
a company can share data
cessing resources among
rge number of people. A
rocomputer can only ser-
e one person at a time. Mi-
computers represent a
t-time cost to a company.
ere is a continuing cost as-
ted with a mainframe.

Graphics packages that are
egrated with the main-
e application are avail-
today.

For example, businesses
report the effect of
ging assumptions with a
casting and modeling
m. Using three or four
hs to show the different
arios, the results from
comparisons are easier to

and the people who are
dy accustomed to the
casting and modeling
ware don't have to learn
to use new software for
phics — the software is
automatic extension of
application.

The latest trend in busi-
ness graphics is graphics
software that transports the
data from the mainframe to a
microcomputer, then discon-
nects from the mainframe. If
a company elects to use
graphics on a microcomputer
only, the data has to be en-

tered each time graphics is
used.

Until about five years ago,
it was almost impossible for
someone without a program-
ming background to use
graphics software.

The technology was avail-
able, but it was often diffi-

cult to use. And the informa-
tion to be graphed could not
be transferred easily from a
financial system to the
graphics software; it had to
be entered again for each
graph.

Today, vendors recognize
it has to be easier to gather

information from the corpo-
rate mainframe to prepare a
graphics presentation.
Graphics that are menu-driv-
en, with Help screens and
user prompts, are necessary.

Bruch and Smith work at
Management Science America,
Inc. in Atlanta, Ga.

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build today will work on the hard-
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start you get with DI-3000. It means you elimi-
nate a lot of programming, debugging, and docu-
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dreds of hours. And speed you to the graphics solu-
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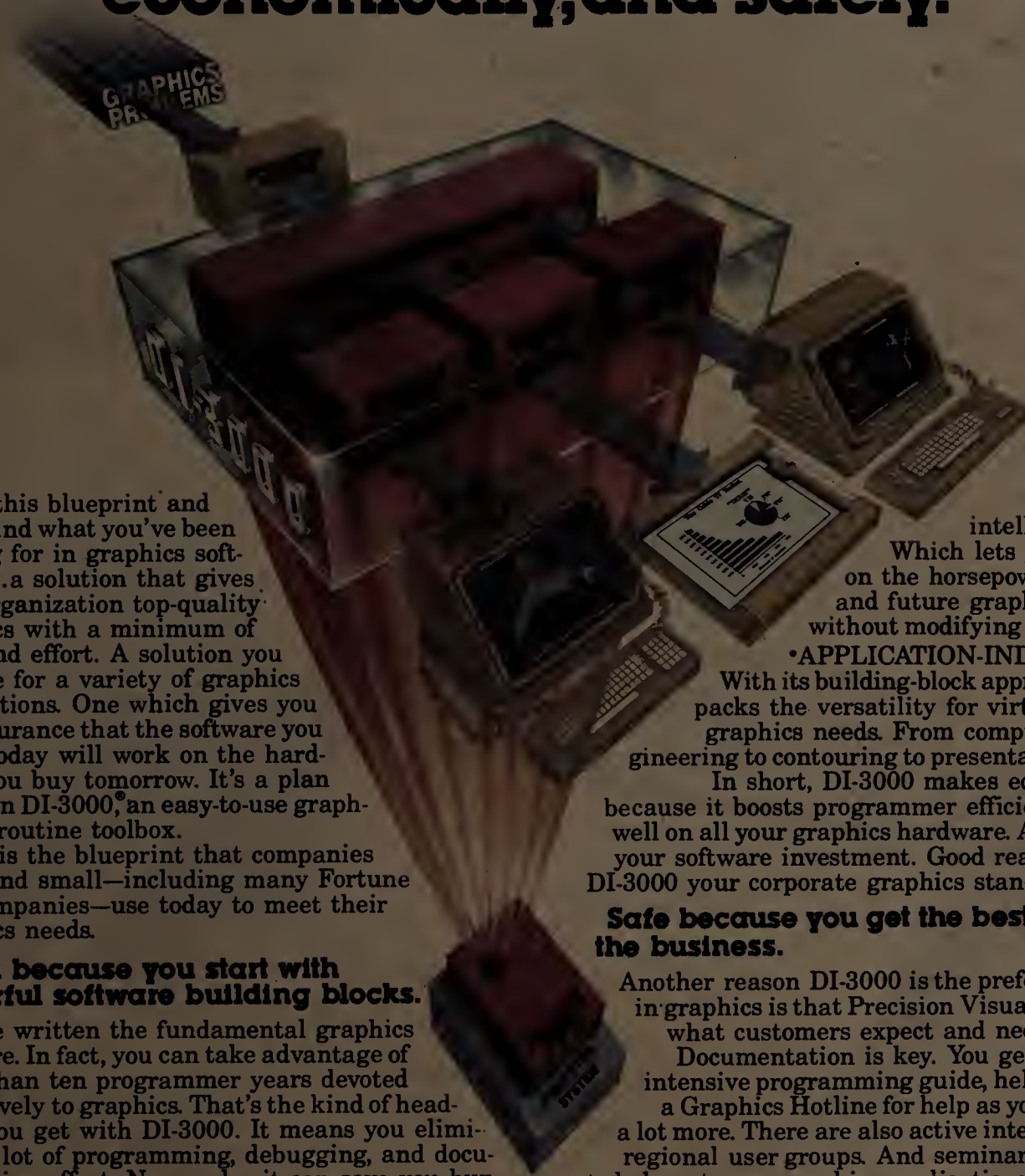
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A User Looks at Business Graphics Software

(Continued from SR/15)

tions for novice and experienced users. A written tutorial disk to take the user through key features of the program is desirable.

For the new user, the manual may be the only available resource to learn and use the program. An uninitiated user should be able

'An uninitiated user should be able to read through the user guide and subsequently produce graphs in a reasonable length of time. It should not take days to wade through the manual to obtain the pertinent information.'

to read through the user guide and subsequently produce graphs in a reasonable

length of time. It should not take days to wade through the manual to obtain the per-

tinent information.

Small things, such as the omission of a critical instruc-

tion, can bring the user to a frustrating standstill. On one occasion, I was trying to boot up a new program and set the hardware configuration. The manual failed to note that the write-protect tab should be removed before writing the hardware configuration onto the program disk.

After following the instructions to the letter, I was presented with the same error message or a blinking cursor. I couldn't get to square one. There was no way of knowing whether I was an incompetent user or the disk was bad or the peripherals were improperly connected until I phoned the software house directly.

Some graphics programs will display only on a high-resolution monitor; others display comparable quality using a medium-resolution monitor. In one instance, the software and color board will work with only two types of monitors.

I have no intention of scrapping my high-resolution color monitor just to purchase and use one particular graphics package. I may need two or three packages to obtain all the features I want. Since obsolescence is a real concern, graphics software (and color boards) should be compatible with a variety of monitors, printers and plotters.

It is my observation that pricing for graphics software varies widely. From my small sample, prices range from \$800 to \$900 at the upper end and \$200 to \$300 at the lower end. Lower prices do not necessarily mean fewer options. As a result, pricing leaves me in a state of confusion. It seems advisable to first determine what you want the program to do and then decide if the price is reasonable.

In addition to the charting options I've indicated, I would like to enter data directly from the spreadsheet. I have been stymied by an automatic y axis value label. If I'm trying to chart 'billions of dollars,' the label displays it in scientific notation.

The next innovation might be "painting" options. It would be a simple matter to plot a bar chart, replacing the more prosaic stacked bar with shapes in the form of oil barrels or ice cream cones.

I'm still looking for the perfect graphics package. It may be out there, but I just haven't found it yet.

Warner works in the Strategic Planning Division of Warner Communications, Inc., New York, N.Y.

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Eight interconnected Control Data Corp. Cyber computers are the heart of Chrysler's computer-aided design system.

All Computer-Designed Car Goal of Chrysler CAD Shop

HIGHLAND PARK, Mich. — In the past two years, Chrysler Corp. has invested more than \$18 million in its computer-aided design (CAD) and engineering program, and it expects to produce the world's first completely computer-designed car by 1986.

From the Technical Computer & Instrumentation Center (TCIC), Chrysler's world center for design and engineering, eight interconnected Control Data Corp. (CDC) Cyber computers, capable of processing 24 million instructions per second,

serve design, engineering, manufacturing and assembly personnel in 14 plants in the U.S., Canada and Mexico.

A common data base is the focal point of Chrysler's CAD system, according to Robert A. Brauburger, chief engineer at TCIC.

"We believe that was the only route to go in CAD," Brauburger said. "To improve productivity and products — which was our aim — our designers and engineers must have the same information at all times. Faster product design means more time for tooling and product testing."

Chrysler's eight Cybers communicate with each other at burst speeds up to 50M bit/sec through Control Data's Loosely Coupled Network. "Response time is no more than four seconds, and users can access whichever computer they wish. A number of engineers can work on the same part simultaneously," said Walter Węglarz, manager of computer systems and operation engineering.

Węglarz said there are more than 550 terminals in the network with about 230 devoted to graphics. By the end of 1983, graphics terminals will number close to 400 — an indication of the growth in CAD activity at Chrysler.

Operations data shows about 1,500 people accessing the computer facility on a regular basis with about 600 doing design work. Commands related to CAD activity alone run about 100,000 per day.

In designing the CAD system, Chrysler divided its eight computers into clusters, such that four Cyber 750s handle all CAD operations; two Cyber 174s are devoted to time-sharing and batch operations; and two Cyber 172s route incoming data to proper storage.

Forty CDC 844 disks and five 885 disks provide a storage capacity of about 16G bytes.

With such a terminal network, telecommunications are a large part of Chrysler's computer operations. More than 1,500 pairs of circuits come into the TCIC facility. Front-end communications is provided by Modcomp Corp. computers, which are also used as pre-processors in various engineering and test areas. Remote maintenance facilities enable communications technicians to handle most terminal operations problems from the communications center.

Chrysler had made its move into CAD within a two-year period — during the time it was undergoing huge financial deficits that threatened the company's continued operation. "We didn't invest in CAD because we were flush with dollars, but because we had to make a fast turnaround in productivity, to be able to meet government regulations more effectively and economically and generate more lead time for product test," said Brauburger.

Improvements in productivity are measurable and growing, according to (Continued on SR/24)

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..SOME OF MY FRIENDS ARE MONOCHROME... WHILE OTHERS CAN BE VERY COLORFUL !!!



Tom Wilson

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Graphics Boom Seen Enticing Venture Capitalists

By Stanley Klein

Special to CW†

Several factors have combined to set the stage for the rapid proliferation of computer graphics systems as key productivity tools of this decade and beyond.

Interestingly enough, while computer graphics existed at the birth of the computer age more than 25 years ago, only five years ago did it, literally overnight, reach a point of economic feasibility when IBM slashed semiconductor memory prices by 40%.

That, too, was about the time that the microprocessor picked up an economic head of steam — twin technical economic advances that played into the hands of computer graphics' avaricious appetite for memory storage and computational power.

The trends that fueled computer graphics continue today. And it is no wonder then that this \$3 billion field will soar in the years ahead. Starting in 1984, graphics revenues will probably return to the heady 40% to 60% annual growth rate present at the turn of the 1980 decade, up from the recession's relatively ho-hum 25% to 30% growth rate.

Entrepreneurial Paradise

And no wonder, too, that computer graphics has become an entrepreneurial paradise. For although it is a fast-growing market, it is still a niche area, one requiring specialized, interdisciplinary skills and knowledge for which computers is but one aspect.

With such a setting, it is not surprising that computer graphics entrepreneurs garnered some \$150 million in venture capital between June of last year and now, based on an analysis of information in both "The S. Klein Newsletter on Computer Graphics" and "The S. Klein Directory of Computer Graphics Suppliers." Approximately 50 new computer graphics companies opened for business during this 12-month time frame alone, the deep recession notwithstanding.

This burst of entrepreneurial activity was dramatically evident when, in a little over a week-long period toward the end of last year, at least seven start-up firms made their debut. That week, Atlanta-based Catronix Corp. unveiled its three-dimensional modeling software, which employs a "new algorithm" that enables the software to run on a mini-computer and which costs \$50,000, truly a price breakthrough for its capabilities.

Interestingly enough, Catronix is an offshoot of a state-sponsored program intended to nurture high-technology business in the state of Georgia.

But of all computer graphics businesses, none has attracted as many entrepreneurs and as much money from venture backers as the turnkey system companies. What is particularly fascinating about this phenomenon is how these application systems come in waves.

'Starting in 1984, graphics revenues will probably return to [a] heady 40% to 60% annual growth ... up from the recession's relatively ho-hum 25% to 30% growth rate.'

The granddaddies, of course, were companies like Computervision Corp., Applicon, Inc. (now part of Schlumberger), Calma Co. (now part

of General Electric Co.), Auto-Trol Technology Corp. and Intergraph Corp. — each of whom staked out the end users in giant companies as their primary market. That was how the turnkey systems business began.

With the advent of microcomputers, entrepreneurs began to single out more narrowly defined application markets. Drafting as applied to mechanical or architectural, engineering and construction applications were first to be singled out, leading to the formation of several new companies.

Earlier this year, a wave of turnkey systems appeared targeted at the printing and publishing field, including technical drawings and documentation where text and graphics merge. Qubix Corp. let it be known that it had targeted this marketplace after acquiring \$2 million venture financing.

Virtually simultaneously, Austin, Texas-based Impres, Inc., started by former Applicon founder Gary Hornbuckle, also announced a technical illustration system that Xerox

(Continued on SR/28)

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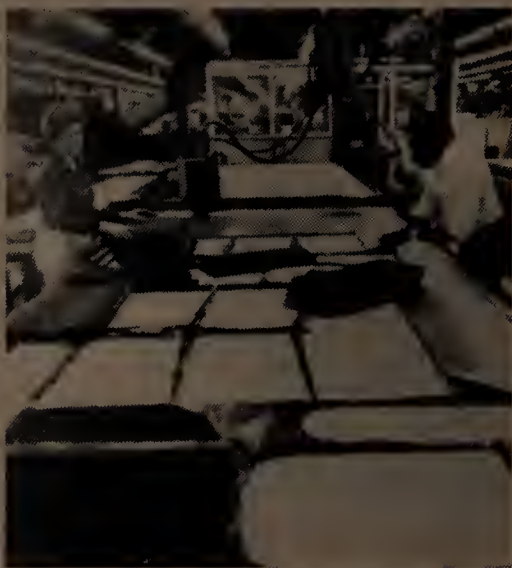
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Chrysler's CAD Driven for Improved Autos



CAD/CAM techniques are used to cut seat patterns for Chrysler cars and trucks. A computer-controlled trim cutter in Chrysler's Trim Plant (right) makes precision cuts in material according to CAD terminal directions from the company's corporate engineering complex (left). Before adopting CAD/CAM, cutting seat patterns was a painstaking, manual job.

(Continued from SR/22)

to Thomas L. Campbell, manager of Numerical Control and Digital Systems Engineering. "Generally, productivity improvements hover in the 4:1 range, but we experience a jump of 70:1 in the production of illustrations for parts and engineering manuals that previously were hand drawn or photographed. Now, they are transferred directly from the graphics terminal to a hard-copy machine and can be presented in multiple views."

Chrysler has its own design software called Quickcon for design and concept for surface modeling and

numerically controlled tool-path generation. Geometric data generated on Quickcon can be passed to another Chrysler-developed program called GCSNAST for preprocessing into finite element models, which are then analyzed by the Nastran structural analysis program.

"Keeping the software user oriented and [the software] simple to learn and use has been the key to our applications development," said Larry Sugg, manager, Engineering Systems Development. "We built the system according to users' needs and enhance it accordingly."

But the TCIC doesn't give away its

computer power and services. Users finance their own terminals and computer costs.

Solids modeling is one of several CAD applications employed at Chrysler. Chrysler began its solid modeling activity with CDC's Synthesis software and was the first user of that package on CDC's NOS/BE operating system.

The program's ability to compute the weight and volume of a component made it easier for Chrysler to improve the fuel efficiency of its cars to an average 27.5 mpg in 1983 — matching the 1985 federal requirement.

Even extremely small parts are computer designed if their geometry requirements make it productive to do so. For example, by using the computer to design a small fuel tube clip, Chrysler realized a 10-fold improvement in design productivity.

As the design process winds down and production begins, the computers continue to furnish design data for the milling machines that generate steel dies for parts-producing machines.

In assembly operations, CAD technology continues to help Chrysler achieve production and quality goals. Positioning the robots to weld together body parts is determined by the Cybers. Through the use of computer graphics, engineers can pre-

view and simulate all robot moves to determine the most efficient motions for proper welds. On the two-door Chrysler K-car, there are 64 locations the robots weld with accuracy.

Chrysler also uses its CAD capabilities in a process called "nesting," whereby designers determine how to cut a particular pattern from a given dimension of fabric to eliminate scraps. From this information, the computer develops a numerical control program for the cloth-cutting machine. Chrysler figures the computerized upholstery design and the cutting application save about \$500,000 a year by eliminating scraps.

In engine testing, Chrysler uses Modcomp computers to gather data from engines under test. At the end of each day, the Cyber 174 automatically signals the Modcomp computers to send their accumulated test data for processing.

Engine maps of test results are drawn in three dimensions by the Cyber to help engineers study the complex engine relationships and make decisions that maximize fuel economy and performance within emissions limits.

"The use of computer technology has helped increase our productivity, which has been a key to our comeback and will determine our future success," said Brauburger.

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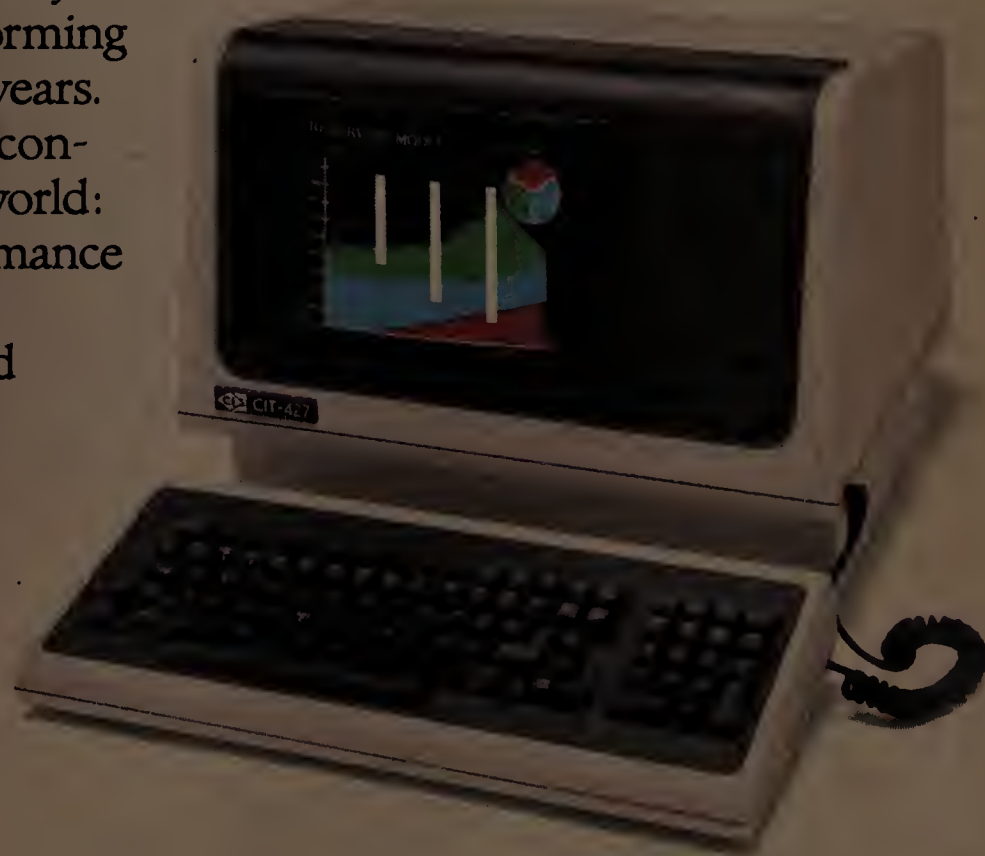
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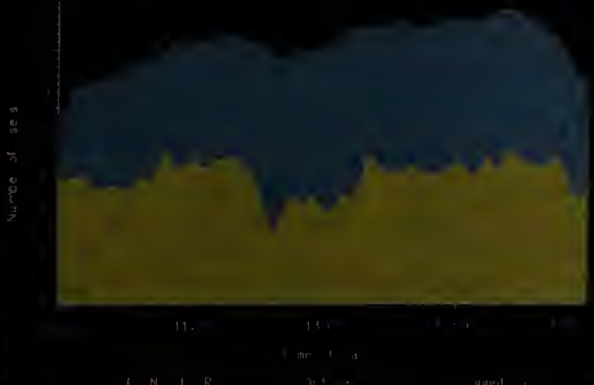
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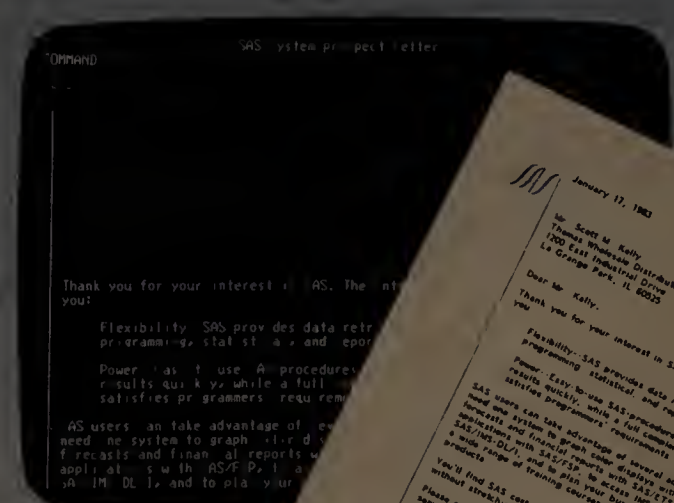
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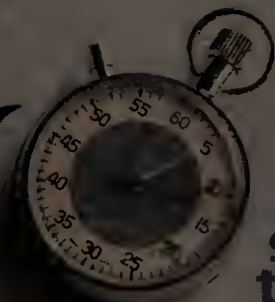
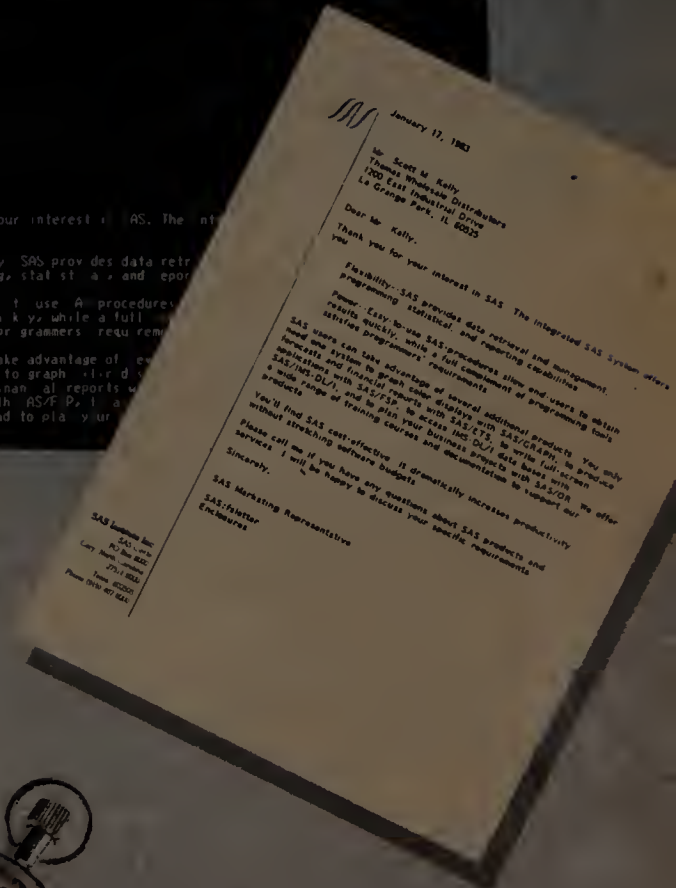
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Consultant's Plotter Aids Commodities Decisions

OREM, Utah — A computer graphics pen plotter has been found by a commodities consulting firm to be a key to advising its clients, some of this country's major candy manufacturers, cereal companies and sugar processors, on pricing, timing and quantities of product-ingredient purchases.

Commodities Information, Inc. (CI) started in 1979 as a consultant to businesses dependent upon commodities. Merrill Bateman, its founder, saw that graphics could help traders make accurate decisions on when and how much of a particular commodity to buy and what price

to pay. The company now produces computer-generated charts and graphs for its clients on such items as sugar, cocoa, grains, oilseeds and

livestock.

"Decisions in commodity trading must often be made rapidly," said Rod Jackson, CI's director of techni-

cal systems commodity information division. "Data presented in line and bar charts is much more valuable

(Continued on SR/30)

Graphics Boom Enticing Venture Capitalists

(Continued from SR/23)

Corp. has begun to market heavily.

Perhaps most exciting of all in this field is XYVision, Inc., which is located in Woburn, Mass. Its system architecture employs a node concept, made up of graphics workstations, mass storage, communications interfaces, peripheral devices, Unix oper-

ating systems software and computer-aided publishing applications programs with large-scale networking capability to become available later this year.

Another outpouring of venture capital has targeted makers of systems that generate computer slides where technical breakthroughs have

enhanced the resolutions and lowered the production costs.

Ultimately, computer graphics may well mean the elimination of physical slides altogether, as the data, stored on floppy disks, can be carried this way as well, displayed via a graphics terminal or large screen projector and then subsequently updated at will.

Another applications wave that appears to be washing over the computer graphics shoreline is in the area of facilities management and planning, whereby a company's physical plant is graphically detailed in a computer for interactive modification and study.

In this way, the contents of an entire building — its internal office structure and partitions, public zones, such as lobbies, hallways, storerooms and bathrooms, furniture, fixtures, telephones and so on can not only be managed, but also planned for via interactive computer techniques.

Making a stab at this field is Resource Dynamics, Inc. in Acton, Mass., whose president and principal stockholder is Robert Collings, the founder of Data Terminal Systems, Inc., and prior to that a key executive at Digital Equipment Corp.

Following the market lead, California Computer Products, Inc., a computer graphics veteran, has also entered the facilities planning and management field. Calcomp, a division of Sanders, Inc., however, is not a new start-up but a large established company.

And this leads into the latest business trend in computer graphics, the entrance of the big companies. Where there is such economic growth forecast, the attraction to this field by the established computer companies and the Japanese was inevitable.

All of this suggests a competitive donnybrook at some point in the future, although the markets served by computer graphics are still essentially virgin at this moment in time.

Klein is publisher and editor of the "S. Klein Newsletter on Computer Graphics" in Sudbury, Mass.

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A Key Decision Support Tool

Color Graphics Gives Surgical Firm Cutting Edge

RANDOLPH, Mass. — Much has been written on the potential of computer graphics as a new tool. With graphics, corporate management data can be presented in a format that is both easily grasped by the audience and accurate in portraying an actual or hypothetical situation.

The question now is whether or not corporations are tapping this potential.

Has any company actually integrated a user-level graphics software package into a multipurpose minicomputer?

One company that has successfully begun to exploit the potential of computer graphics as a data presentation and decision support management tool is Codman & Shurtleff, Inc., based here.

Codman, a Johnson & Johnson company, manufactures surgical instruments, implants and other surgical devices.

User-Level Applications

Codman's management information systems (MIS) department uses a variety of computers for user-level applications, including a Wang Laboratories, Inc. VS-100 minicomputer. Several departments of the firm use the Wang VS on a day-to-day basis for such tasks as order processing, accounting, word processing and manufacturing.

The MIS department has recently added a color business graphics system to its Wang computer environment that not only gives Codman's users the ability to key into company data for conversion into graphics from any VS workstation, but also allows them to extract data from the Wang data files for use in charts without any manual input.

Furthermore, a financial modeling package that is integrated into the graphics system allows hypothetical situations to be portrayed graphically as well.

The package — EDC Graphics Impact from Engineering Design Concepts, Inc., a software vendor based in Hingham, Mass. — was designed to be added onto a computer that is already on-line and already being used for several different user-level applications.

In order to produce color graphics output, the software drivers necessary make color peripheral devices, produced by several different hardware manufacturers, compatible with the Wang computer. The configuration chosen by Codman includes a Hewlett-Packard Co. eight-pen plotter and a Ramtek Corp. color display terminal.

All building of graphs is done through a Wang workstation, and finished charts are sent to the desired output device through the choice of a prescribed function key. The software is menu-driven and conversational.

No procedure or programming codes are required to run the system. The system menus and programming procedures are purposely made similar to other Wang application pro-

'With graphics, corporate management data can be presented in a format that is both easily grasped by the audience and accurate in portraying an actual or hypothetical situation.'

grams so that new users can learn how to run the package in a relatively short time, a Codman spokesman said.

Paul Newton, Codman's MIS manager of long-range planning and sys-

tems integration, said they chose the software because, "we were interested in providing management graphics to our users, which were fully integrated with our hardware and software direction. Color graphics is

a key technology in implementing decision support tools within our business.

"A package like EDC Graphics Impact is much more desirable to us in that we could introduce it to our user community with minimal training and no impact on our MIS resources," he continued.

Codman did not previously have computer business graphics capabilities. If someone needed to draw a chart based on management data, it would be done by hand. "Once peo-

(Continued on SR/30)

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Surgical Firm Gets Cutting Edge With Graphics

(Continued from SR/29)

ple found out that we had this graphics capability, we had a rush of people using it, especially the Finance division," said Mary-Margaret Miller, who is a member of Codman's new information center.

"What we've done is put the color plotter and monitor in one room along with three Wang terminals so that those who need to work with graphics can see their results immediately."

Up until now, Codman has used their graphics software package for presentation purposes, including such things as review with senior management in Johnson & Johnson. Pie and bar charts were produced with the EDC Impact Graphics system, portraying such things as Codman's sales by business segment.

Only recently has Codman begun to take advantage of the most powerful capability of this software, which has the ability to extract data from the Wang VS data file, perform mathematical functions on selected data fields and store the extracted data fields.

Special Utility

A special utility moves Codman's users out of the realm of business graphics for presentations and into the realm of business graphics as a decision support tool.

This concept of graphics plus analysis is what Engineering Design really had in mind when it introduced the package.

In a recent project, one user, whose job is managing Codman's product inventory, extracted inventory backlog data and presented it as a bar chart.

The magnitude of each bar showed the backlog situation in each of its product categories. The user then added in data from the financial

modeling program depicting the inventory backlog goal figures. The modeling utility then calculated the difference between the actual and desired inventory backlog figures, and depicted the three sets of figures as a clustered bar chart.

"The ability to extract data is the key to this whole thing," John Galvin, an information center manager at Codman said.

"Our financial and plant managers can now use the graphics software to depict things like planned

weekly production starts versus the actual product completions in a chart.

"Once you fully utilize it, the software can be a very powerful tool for a company's decision support," Galvin said.

Graphics Pen Plotter Aids Consulting Firm

(Continued from SR/28)

than data in written form. Graphics let prospective commodity buyers and sellers size up a situation at a glance, rather than spending hours going through reams of paper."

To present its computer graphs, CI first attempted to use a printer/plotter on a time-sharing basis from a local university. The results were less than satisfactory. "Resolution was bad, and we were restricted to one color: gray," Jackson said. "It was really difficult to spot trends quickly with such crude charts. So we began looking for an alternative."

The firm chose a Hewlett-Packard Co. Model 7221S plotter to provide hard-copy output of the data in clear, concise charts that helped display critical supply, demand and cost relationships, track trading history and predict future trends of a commodity. The HP 7221S plotter has a resolution of 0.025mm, allowing it to draw up to 40 points in a space of 1mm, resulting in smoother diagonal lines, curves and characters.

The plotter holds up to eight pens of different colors to produce graphics and charts on paper, overhead transparency film, vellum and polyester film. With automatic paper feed and cutting, the device does its job unattended. It interfaces with CI's Digital Equipment Corp.'s VAX-11/750 minicomputer, with software support from two graphics packages, the HP Plot/21 and Issco, Inc.'s Dis-

pla graphics package.

According to Jackson, CI combines two basic types of data to generate its commodity charts. The first is fundamental information about the commodities themselves and various factors that could influence supply and demand. For example, it is necessary to determine how many tons of sugar each of the sugar-growing countries produces, as well as worldwide consumption rates. Other factors in this category include weather and political situations that could affect the commodity price.

"The U.S. might impose a tariff that would completely change the sugar market," Jackson noted, pointing out that a recently passed tariff raised the price of sugar from 8 cents to 22 cents a pound. "Or, a typhoon in the Philippines could destroy a good portion of a crop. Both could drastically affect the market, and we must pass this information and its projected impact on to our clients."

CI collects its second type of data, the price history of a commodity, directly from commodity exchanges and translates it into chart form using a technique called Technical Commodity Trading System. This system assumes that everything necessary to know about the price of a commodity is contained in its price history. "In other words, the best indicator for future prices is past prices," Jackson explained.

When news is received that will

impact the market, CI makes the information available to its clients via a weekly telex and monthly newsletters containing charts for each of the commodities with which the firm deals. Clients, through a direct dialing system, can also tap the CI computer and either view the charts on their own terminals or have them printed on their in-house plotters.

Three Types of Charts

Three types of charts are used by CI to convey market trends and other factors. The first is a bar chart that shows the open, high, low and close prices for a particular commodity over a given period of time. "The bar chart also is used to indicate daily stops, which tell the buyer when to sell and when to buy," Jackson said.

Line charts are used to plot commodity price averages, relative price strength of the commodity and average directional price movement. These charts offer two advantages over bar charts, Jackson said: "They require less time to reproduce, and averages can be more easily identified because they are not obscured by bars and stops."

The third type is the point-and-figure chart, also known as a sliding-bar. This form, for example, is frequently used to chart stock movements, such as illustrating Dow Jones Industrial averages for a week. CI uses these charts to note only major price moves and display highs and lows on each commodity, he said.

According to Jackson, in addition to drawing the CI charts, the HP 7221S plotter also is a major marketing tool for the firm during negotiations with prospective clients. "The plotter is a great sales tool. When clients come to visit, we show them the plotter at work as one of the key tools to be used in their behalf.

"We selected the Hewlett-Packard plotter for several reasons," said Jackson. "It is cost effective and compact. It also provides excellent resolution and reproduction capabilities. Finally, and perhaps most importantly, we don't have to babysit the plotter. Things get hectic enough when the market really starts to move. We don't want to get bogged down with changing pens and feeding paper."



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Business Graphics Termed for Managers Only

By John Lehman

Special to CW†

Business graphics, while widely discussed as a branch of computer graphics on the verge of rapid growth, is currently a content-free term. Discussions of business graphics treat very different systems; the common denominator is that business graphics involves the use of computer graphics by businesses.

This interpretation includes almost every conceivable use of the technology: computer-aided design and manufacturing (CAD/CAM), artistic productions and even video games, in addition to the more widely accepted set of slide generations and applications, which appear to have something to do with decision making.

Such a broad definition is not useful either to those attempting to decide what (if any) of the new technologies to adapt or to those attempting to study productive uses of graphics technology.

The term "business graphics" should refer to the use of graphics by managers in an organization. This narrower meaning eliminates applications intended to aid other professionals (such as CAD/CAM), as well as applications that are intended as end products of the organizations. It facilitates use of existing research on management activities. This not only helps classify existing systems, but also helps identify opportunities for additional management use.

Communication and decision making are the best candidates for graphics support among management activities. Communication is the activity that most managers appear to spend the greatest amount of their time performing. Decision making is the traditional management activity.

Communications support involves presentation of information, organization (scheduling) of activities and support for group decision making.

Presentation of information is the activity most commonly associated with business graphics today. Computer graphics support for it is simply the automation of existing manual systems — in this case, art departments and other slide makers. Existing computer graphics products support this market fairly well.

Organization of activities is a problem both for projects being managed and for the managers themselves. Ap-

proaches such as Gantt charts are the traditional approaches to project management; this approach uses a graphical display that is sometimes automated.

Organization of managers' time and activities is usually done manually with calendars as data files and displays. But automation of

the calendar management function is beginning to appear as part of "office-of-the-future" projects.

Group decision making is carried out by meetings. Many of the activities could be carried out more economically and with fewer scheduling problems via computer conferences. The addition of

graphics facilities in such conferences would make them more broadly useful, since the presentation of information in graphics form, which is the most widely used form of current business graphics, could be included.

Decision-making support can be usefully described in

terms of what part of the human information processing system a decision aid supports or automates. The relevant parts of this information processing system for graphics are short-term memory and processing.

Computer graphics support for management activities (Continued on SR/32)



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Such is the task at the Timken Co. And it's not surprising that the company zealously safeguards its design quality and the performance of its designers.

Timken's use of a computer-aided

design and manufacturing (CAD/CAM) software package has been extensive and spreading. Since its installation last year, "We already have seen many important advantages... we see even bigger benefits ahead," according to David D. Hoecker, chief engineer of technical services and standards.

Timken, headquartered here, is a Fortune 500 company with plants and facilities around the world, nearly 16,000 employees, sales above \$1 billion a year. It manufactures and markets tapered roller bearings, al-

loy steels and percussion rock bits.

Tapered roller bearings, the initial product when the company was founded before the turn of the century, remains the principal product line. It is here, where the need for precision design is especially strong and where the drawing work loads are heavy, that CAD/CAM is initially applied. About 70 engineers and draftsmen have so far been trained on the system and use it regularly to aid them in designing bearings and tooling.

Four IBM 3251 graphics display terminals are now in place at company engineering facilities and are kept busy 18 hours a day. The CAD/CAM package in use is IBM's Computer-Augmented Design and Manufacturing (Cadam) software, running under IBM's OS VSI operating system.

The terminals and other 3251s in the research center and in technical services are on-line to a host IBM 3081 computer that maintains the Cadam data base, consisting currently of thousands of bearings and the tooling drawings, plus specifications and computational data.

"We brought in Cadam after a lengthy and thorough study, and we are applying the system on a step-by-step basis," Hoecker explained. "Our first goal was to ease the mounting drawings work loads by eliminating the need to create a drawing manually, and the system has more than met our expectations here. We've achieved an average 4:1 productivity gain ratio in creating drawings and an even higher gain ratio in revising

(Continued on SR/34)

Business Tool Gets Definition

(Continued from SR/31)

nature of management work and the structure of managers' information processing systems if computer graphics systems are to be used as management tools rather than CAD/CAM tools.

The decision to purchase computer graphics technology for management support should be examined in terms of what management needs rather than in terms of the technology itself. The typical approach today appears to be the automation of existing manual graphical facilities.

Designers should be more concerned with systems that are application-driven rather than technology-driven. This is not to say that development of new technology should wait for a clearly expressed need, but applied systems should be configured based on the needs and desires of the users, rather than based on the technological state of the art.

Researchers need to know more about how managers manage and what tools are appropriate to support what types of activities.

Lehman is an assistant professor in the University of Minnesota's School of Management.

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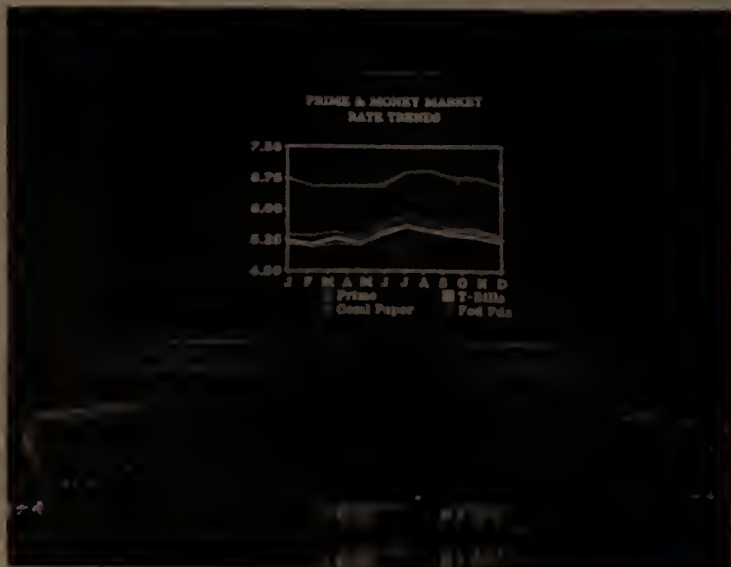
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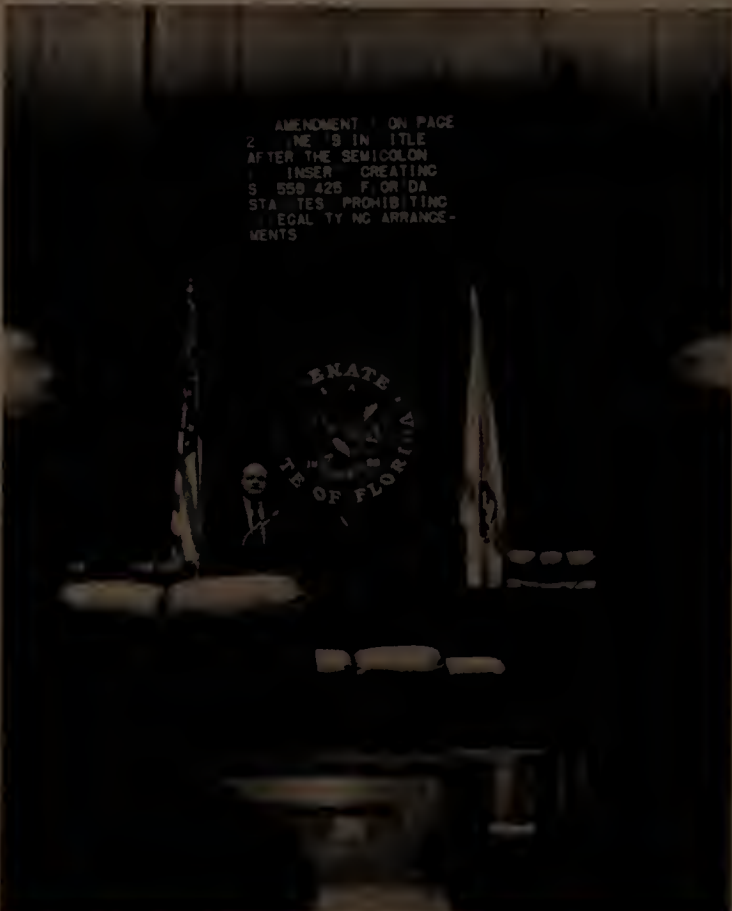
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IN ENGINEERING: General Electric projector displays computer-assisted design for Engineering Society of Detroit seminar.



IN GOVERNMENT: General Electric projector displays amendment for Florida State Senate to inspect before voting

GENERAL  ELECTRIC

Spurring Rush to Automation Graphics, Simulation Proving Powerful Tools

By Van B. Norman
Special to CW†

The rush to industrial automation, driven by increasing international competition, is intensifying with the use of computer graphics and simulation. Computer graphics now allow builders of simulation models to respond quickly to requests for models. Additionally, the animated graphical display of models is proving a powerful tool in validating models and educating automation system managers.

To justify an automation project, the system designer must reduce production costs. Three cost-saving areas are receiving attention:

- The reduction in labor costs through automation, particularly with robots and automatic guided vehicles.
- The reduction in inventory carrying costs through better scheduling, smaller lot sizes and just-in-time material deliveries.
- The increase in production equipment efficiency through quick tool changes and better scheduling of material delivery.

These changes directly affect today's production and inventory control manager.

Brought Processes Together

The increase in automation has brought the manufacturing, material handling and material management processes closer together. The buffering or decoupling between these processes in more traditional facilities, which was available because of floor stock and manual load movement, is not present in the automated manufacturing facility. Continuous use of production equipment requires that materials arrive at the work center on time and are then removed before queue build-up shuts down the machine.

The materials manager installing or designing a highly automated facility or project must be sure the facility will work right the first time, because there is little opportunity to correct it once it is installed. He must understand that in highly automated projects, the various subsystems are tightly coupled and they should be thoroughly tested before making a commitment to construction or equipment.

Computer simulation is a technique for observing a system in operation synthetically. Just as a model of an airplane is constructed and tested in a wind tunnel, a computer simulation of an automated manufacturing facility allows the planner to test his design under various simulated operating conditions.

Equipment layouts, material handling systems, product flow and scheduling rules are logically represented in a computer program. As the program is executed in the computer, the simulation program replicates the operation of each piece of equipment and automatically collects system performance statistics, such as equipment utilization and processing delays.

In order for the system designer to consider seriously the simulation model, it must first accurately represent the automation project in three major areas:

- The mechanical equipment in the facility must be correctly depicted. This includes performance parameters such as processing times, transport speeds, physical location and reliability.
- The equipment control rules must be determined and included in the model. This includes such things as automatic vehicle dispatching,

storage/retrieval machine sequencing and tool and set-up scheduling.

- User operational rules must be defined and tested in the model, such as manpower availability, preventive maintenance schedules, lot sizes and production schedules.

Accurate simulation models coupled with graphical displays of dynamic simulation allow designers to see their design in operation. The new technology involves the creation of a simulation model and a graphical description of the facility in one operation.

System designers can now design their system interactively. The graphics workstation consists of a high-quality vector graphics display, interactive graphics tablet, control dials for manipulating viewing perspectives and a control console. Designers may choose menus from the various components of their proposed system. Components may include such equipment as robots, machine tools, assembly stations, automatic storage and retrieval systems, systems conveyors, carousels

(Continued on SR/38)



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The Strobe 260 is the first eight-pen plotter and software package available for under \$1,000. With just a few keystrokes on your computer, the system produces superb high-resolution charts, drawings and transparencies with up to eight automated color breaks. The even more economical Model 200 produces the same wide range of graphics with a single pen which may be changed manually.

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and Osborne systems. What's more, the StrobeWare software programs provide every graphic format you will probably ever need, including multicolor pie charts, bar graphs, line graphs, text processing, and a broad selection of symbols and character styles. To further increase your capabilities, the new Strobe systems also interface with over 40 other popular graphics programs.

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The Strobe Graphics System
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CAD/CAM Boosts Engineering Firm's Yield

(Continued from SR/32)
drawings."

Precision is critical in the design of a tapered roller bearing, according to the firm. The tapering must be precise so that the bearing can relieve friction regardless of the angle for the seating of the bearing.

Using the graphics termi-

nal, the designer touches a light pen to the screen, keys in geometry and the system begins building the drawing. The designer can view the design from top, sides or bottom, rotate it, shrink or enlarge it, make changes as he sees fit, and, when satisfied, touch a button to send the design to the data base and

command the system to plot and produce the drawings on paper electrostatically.

"In addition to the welcome time savings, the system makes other valuable contributions," Hoecker pointed out. "Drawing quality is improved and accuracy is greater. And because the speed of the system makes it

easier to create and consider design alternatives, design quality itself is improved."

Not long ago, Timken doubled its research staff and facilities. The mission of the research center is to develop new and improved products, expand applications of existing products and develop new, more efficient tech-

niques for product manufacture. Graphics terminals are on-line at the research center and Cadam is used extensively to support the research effort.

Bearing application engineering is an area in which the computer graphics system is just beginning to be applied. Timken's application engineers work closely with customers who are developing new or modified equipment and need new bearings for that equipment. The aim is to come up with the bearing design that is best suited to the new or modified equipment requirements, a Timken spokesman said.

Complete descriptive dossiers — structural and dimensional data, heating, cooling, lighting and electrical system details — on each of Timken's 21 domestic plants and facilities now reside in the Cadam data base. Included are current drawings showing the layout of work areas and the placement of equipment with those areas.

Timken aims to expand utilization of the computer graphics system. Two of the graphics terminals at the technical service center are used almost exclusively for training purposes. Plans call for tripling the number of 3251 graphics display terminals on-line and eventually about 200 engineers and technical personnel will be trained to use the system.

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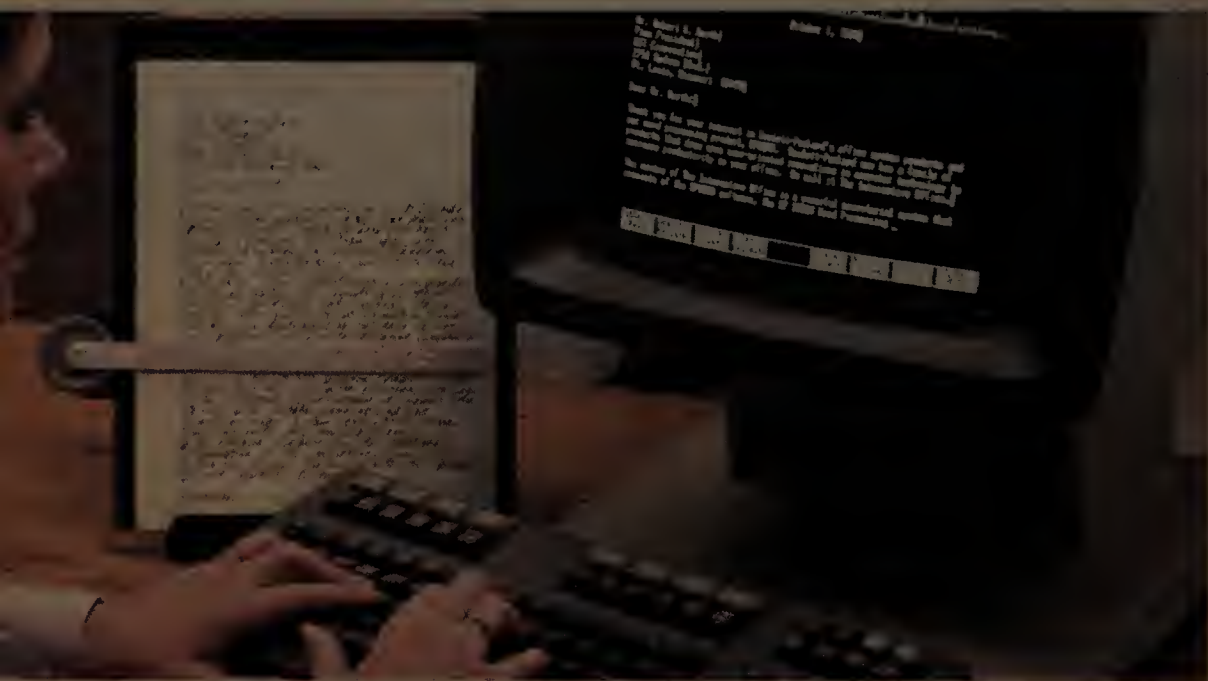
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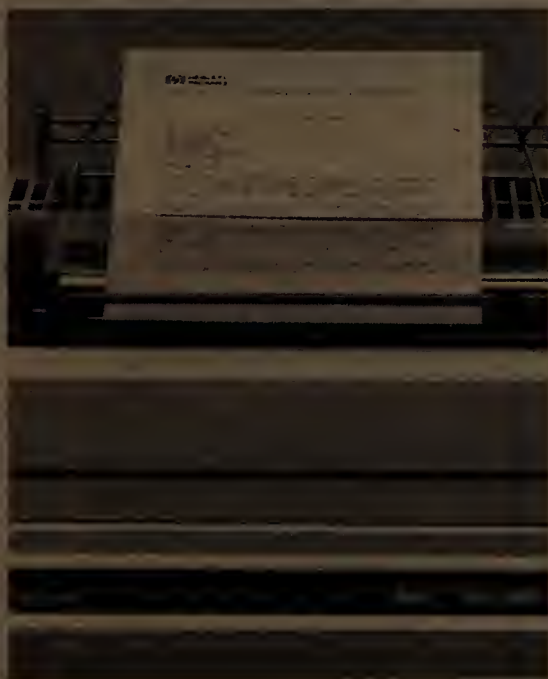
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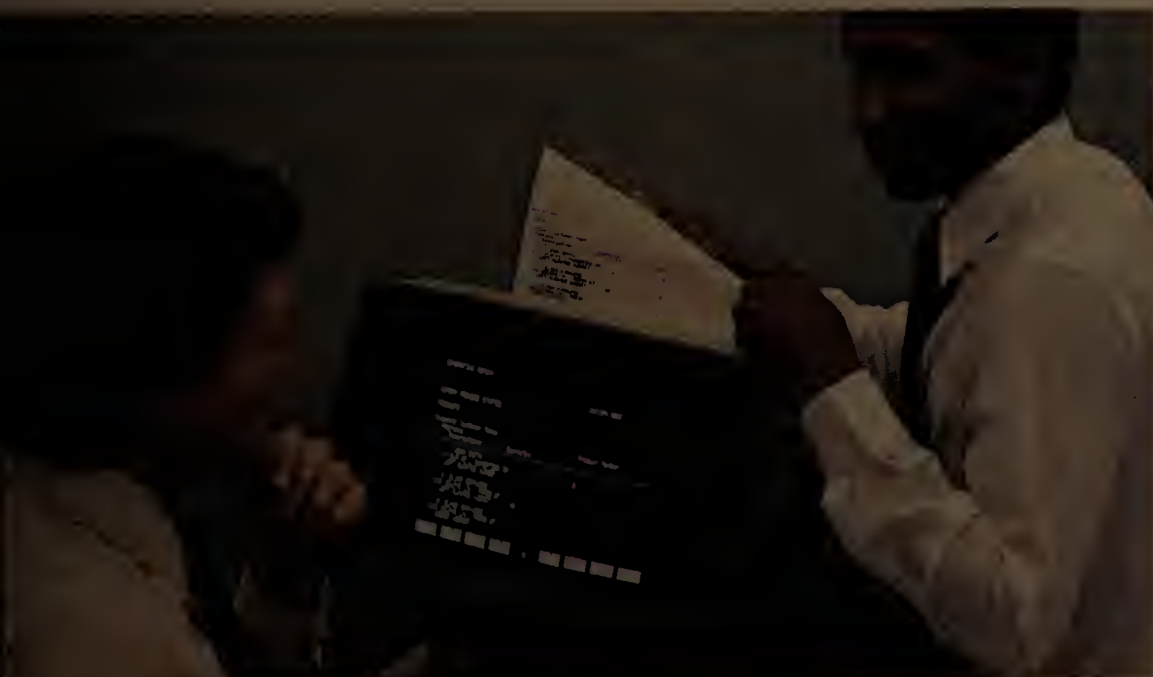
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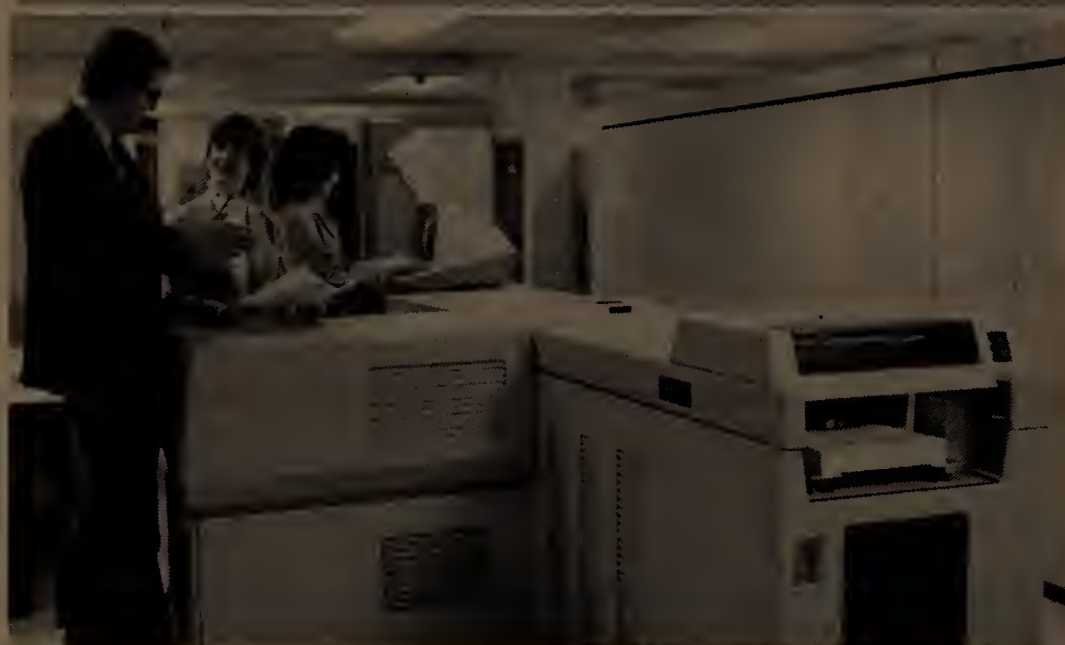
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Paul M. Ingevaldson, Ace data processing director, reviews firm's checklist with Crystal Cooley, Ace project manager for merchandising systems. They are shown with the Xerox Corp. 9700 electronic printing system.

Electronic Publishing System Manages Firm's 'Checklist'

OAK BROOK, Ill. — Better dealer service, higher quality, faster turn-around, increased accuracy and greater efficiency are the benefits a merchandising cooperative here is achieving through its new electronic publishing operation.

Ace Hardware Corp. installed an electronic publishing capability for automatically merging text, data and graphics and is using state-of-the-art technology to improve the production of its dealer order book, called the checklist.

Ace Hardware has distribution

centers located in or near Chicago; Atlanta; Los Angeles; Lincoln, Neb.; Dallas; Toledo, Ohio; San Francisco; Tampa, Fla.; and Baltimore. A 10th distribution center is under construction in Yakima, Wash.

The distribution centers each stock about 36,000 items. The items are cataloged in the checklist, which consists of five 4-in. binders per center or a total of 45 binders for all nine centers. Used by dealers to place orders, the checklist displays items on 5,500 pages (2,750 standard 8½- by 11-in. sheets printed front and back) for each center or a total of 49,500 pages for all centers.

For each item, the checklist includes text in the form of an item description. (Continued on SR/40)

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Graphics Spurs Automation

(Continued from SR/33)

and inspection stations.

Predefined with the graphical images and performance characteristics of the equipment are proven system control algorithms. Designers without drafting skills can now create valid simulation models and visual displays of existing or proposed systems. Then, as the model executes in the computer, the graphics screen shows an animated display of the system in operation. The designer can even change his viewing perspective or zoom in on any section of the facility.

Models have other uses beyond the important validation of a system. The combined use of computer graphics and simulation is a tremendous technology amplifier. Experience has shown that model development time may be increased by a factor of 10 by using a graphical input device to eliminate many of the time-consuming tasks in model development. Additionally, the resulting models are more accurate because they are developed from a library of proven prototypes.

Graphics can also be used to enhance simulation results. Traditional simulation techniques provide statistics of system performance parameters averaged over long periods of simulated time. These are essential for evaluating and comparing system performance. Frequently, however, the designer should see instantaneous system performance to evaluate bottlenecks and other system problems.

The dynamic display of a system in operation offers the designer such an opportunity. Three-dimensional animated graphics of a planned operation, complete with robots, machine tools, conveyors and so forth, provides an unmatched perspective. Animated graphical displays are a powerful way to validate models and to show end users the effects management decisions have on a system's operations.

Norman is manager of simulations at Autosimulations, Inc. of Bountiful, Utah.

In Concert With Graphics

DSS Evolving With Expanded Analysis Features

By Barry J. Frankel
Special to CW†

Over the last five years, computers have been increasingly used by organizations to solve end-user problems. Two software segments that have experienced very rapid growth are decision support systems (DSS) and graphics. These technologies are beginning to be used in concert and, in some cases, in integrated systems.

DSS evolved from financial modeling systems as additional facilities such as sensitivity analysis, "what if" analysis and goal seeking were added. These facilities provided users with a rapid means of analyzing alternatives.

The examples below show how easy this man-machine dialogue can be using current textual technology.

Sensitivity analysis allows users to examine how a calculated result changes as an assumption is altered. The assumption can be altered by adding or subtracting a desired amount.

A typical user dialogue might be: What is the sensitivity of earnings to price by 5%, 10% or 15%?

In this example, we would see how sensitive earnings are to changing the price.

DSS Determines Input

Goal seeking is similar in terms of user effort, but it allows a user to request that the DSS determine the input required to produce the desired result.

A typical dialogue might be: What must price be for earnings to equal 2.95?

In this case, the user wants to know how a product must be priced in order to achieve a desired level of earnings.

Using the few conversational phrases shown above, the software would produce a table of information that presented how the models' results changed as input was varied. This is a vast improvement over traditional paper-and-pencil methods and was far easier than early programming language approaches. The only problem is that the user now must analyze the numeric results of the computer analysis.

User demand for graphics began to skyrocket when the cost of graphics terminals began to drop sharply. Until several years ago, graphics devices were both large and expensive. Rarely seen in user areas, they were usually hidden away in corners of the computer room or attached to dedicated computer-aided design systems in the engineering groups.

The rapidly declining cost of computer components brought an explosion in the use of graphics devices outside of the traditional engineering applications. Where graphics was an interesting component of a DSS procurement three years ago, today it is a required item.

A major driving force in the expansion of end-user graphics demand was the introduction by IBM of the 3279 terminal. This terminal offers color graphics as well as the

standard 3270 features.

DSS products soon began to add color graphics capabilities. Graphics had always been used in decision making, and now they were affordable. The initial approach of software suppliers was to provide a separate freestanding graphics product that could access data that had been developed using their DSS product.

Although this approach eliminated the need to reformat data to make it compatible with stand-alone graphics packages, it was not very flexible. The better approach was to

integrate the graphics with the existing DSS product so that data could be graphed as soon as it was developed.

Today, state-of-the-art systems allow users to use the same commands in the graphics area that they use for "what if" and sensitivity analysis. Results from the "what if" commands issued in the graphics area cause graphs to be generated automatically.

For example, a command asking "What is the sensitivity of earnings to price by 5%, 10% or 15%?" would produce a family of four curves. Each

curve would be a different color and line pattern and there would be a table explaining what each curve represents.

Three of the curves would show how earnings vary over time for each of the alternative pricing cases. The fourth curve would show the original data where price is unmodified. Users can see the effects of their analysis graphically more rapidly than they can with conventional numerical reporting.

This facility is available for sensitivity analysis.
(Continued on SR/42)

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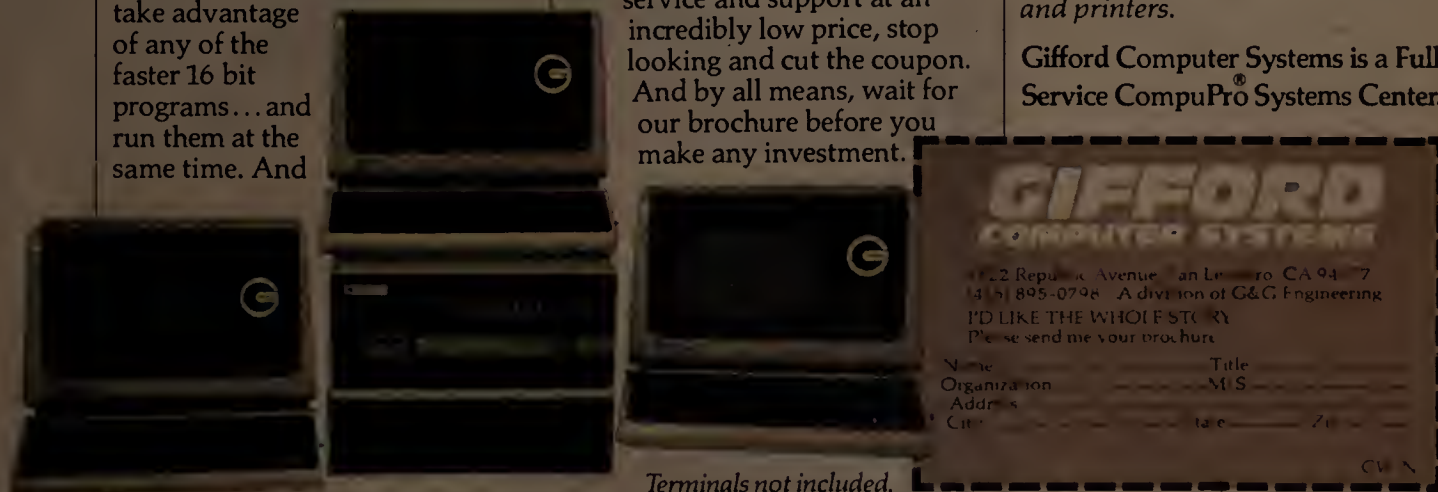
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Publishing System Helps Firm Organize Books

(Continued from SR/38)

scription and data such as item identification number, order multiple and price. In addition, approximately 28,000 of the 36,000 items are graphically illustrated with line drawings to make it easier to identify items.

All 36,000 items displayed in the checklist are grouped by one of nine departments. To keep item ordering information current, each of these departments is updated approximately every nine weeks. The updates may affect up to 30% of the items in a department. Consequently, about 18,500 checklist pages are changed every nine weeks.

Previously, word processing equipment was used to store text and data for all items on separate floppy disks maintained for each distribution center. Copies of line drawings were stored in file cabinets by stock number.

To update items, changes were entered in word processing equipment. Revised text and data were printed out on preprinted forms. At the same time, copies of line drawings were pulled from the file cabinets. Text, data and line drawings were then manually pasted up for reproducing updated checklist pages.

Time for a Change

This procedure was time-consuming and was becoming inefficient with the addition of new distribution centers. A better way of producing and updating the checklist was required. A committee was formed in 1980 to implement this development program. Headed by Paul M. Ingevaldson, the company's data processing director, the committee investigated the possibility of electronically publishing the checklist.

Ace Hardware turned to Xerox Corp. and installed a Xerox 9700 electronic printing system in December 1981. Consisting of a xerographic printer, control module, magnetic tape unit and CRT console, the 9700 system simultaneously reproduces computer-generated text, forms and graphics on 8½- by 11-in. cut sheet paper. Printing at speeds up to 120 page/min, the system provides virtually unlimited type style selection. The 9700 system can also automatically print on both sides of a sheet of paper.

In September 1982, the Xerox graphics system was installed. Consisting of a Xerox 150 graphic input station, graphics handling option and Xerox's Ethernet local communications network, the system has made it possible to digitize graphics, such as line drawings, and easily merge and print them with text and data.

As a result, the need for conventional typesetting and paste-up operations has been reduced. The graphics system is being used in conjunction with the Xerox Integrated Composition System (XICS), a software package that automates composition and page makeup.

"Ace Hardware served as a test site for Xerox because it was the first company in the country to implement an electronic publishing sys-

tem using the 9700, graphics and XICS systems," Ingevaldson stated. "The challenge was to get the electronic publishing system to work for our checklist application. We knew cost-justification of the system would then automatically follow."

A state-of-the-art IBM shop, Ace Hardware uses an IBM 3081 Model K system as the host computer for its electronic publishing operations as well as for all other data processing applications. Following installation of the Xerox 9700 system in late 1981, Ace Hardware developed about 50 computer programs over a 15-month time frame, according to Crystal Co-

ley, project manager for merchandising systems.

First, she said, programs were developed for converting the checklist text stored on word processing floppy disks to computer disk storage. Next, programs were written for operating daily file maintenance runs. Finally, weekly updating, composition and printing runs were programmed.

When the Xerox 150 graphic input station was installed in late 1982, work began on digitizing the 28,000 line drawings used to identify items displayed in the checklist. Line drawings were pasted up and

scanned on the graphic input station. The illustrations were then printed on the 9700 system for quality checks, then stored in digitized form in computer disk files. This initial digitizing work was completed in January 1983.

Each day, the electronic publishing system operates a maintenance run to keep track of item changes and pages that must be updated. When each department is updated on a weekly basis, changed items are printed out on a proof form for review and approval. Updated pages containing all changed items are then automatically produced.

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A U.S. Navy ship approximately 70% complete at Todd Shipyards' Los Angeles Division.

Shipbuilder's Graphics Goes To the Seeing of Its Ships

SAN PEDRO, Calif. — From the barges of the Egyptians to Columbus' Spanish galleons to the modern-day naval frigates, basic ship design problems have remained about the same: How do you make sure the hull design is smooth and sleek, with all the complex curves bowing and joining properly? How do you keep the weight down and keep it low in the water? How do you extract manufacturing data from your ship design? How do you make sure that the boat is producible, given your shipbuilding facilities?

Todd Pacific Shipyards, Los Angeles Division, is using an advanced computer graphics system to find fast, efficient solutions to these age-old shipbuilding problems. An important element in Todd's system is a Digital Equipment Corp. VT100 terminal enhanced with graphics capability.

Used by engineering management to formulate design procedures, perform design work and review ship designs, the enhanced terminal works in conjunction with Todd's dedicated graphics displays.

"During the past two years, all our ship design and manufacturing has been computerized to some extent," said Rick Lovdahl, supervisor of the Hull scientific section at Todd Shipyards' San Pedro, Calif., operation.

Full Graphics Capabilities

"With the [DEC] engineering enhancement, my DEC terminal now provides full graphics capabilities and 640-by-480 resolution for design work and a standard alphanumeric mode for text processing," Lovdahl said. "Before, I used an alphanumeric terminal for text and programming and had to 'bump' one of my engineers off his graphics terminal to inspect a design, or help someone with a problem."

Although Todd Shipyards ranks among the largest defense contractors to the U.S. government, the firm has also built commercial oil tankers and natural gas carriers.

Contributing to this design effort is a powerful computer-aided design and manufacturing (CAD/CAM) system implemented on two Prime Computer, Inc. 750 computers with 4M bytes of main memory and 900M bytes of disk addressing range.

In addition to the Retro-Graphics enhanced DEC terminal, Lovdahl's group has four Tektronix, Inc. 4010 series monochromatic terminals and two Ramtek Corp. 6412 full-color graphics displays. A flatbed plotter, capable of rendering 6- by 16-ft drawings, is used for hard-copy output of designs.

Two commercial software packages, MCS, Inc.'s Anvil 4000 and Autokon, as well as in-house computer programs, give the Todd engineers the ability to draw, design and refine their ship hulls on-screen.

Lovdahl's terminal, a DEC VT100 alphanumeric CRT display, has been upgraded to full graphics capability with the addition of Digital Engineering, Inc.'s Model VT640 printed-circuit board enhancement. A low-cost alternative to dedicated graphics displays, the Retro-Graphics upgraded terminal emulates the graphics functions of the Tektronix 4010/4014 series terminals and is compatible with industry-standard graphics software.

In Lovdahl's work, graphics capabilities are particularly helpful. "Your eyes can pick up an amazing amount of information in a short amount of time," he said. "When I inspect a design on my terminal, I

(Continued on SR/42)

for less.

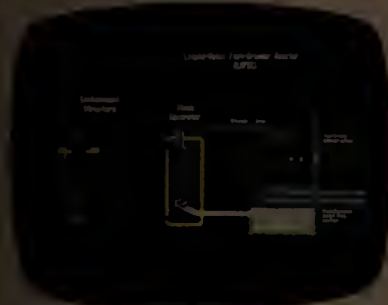
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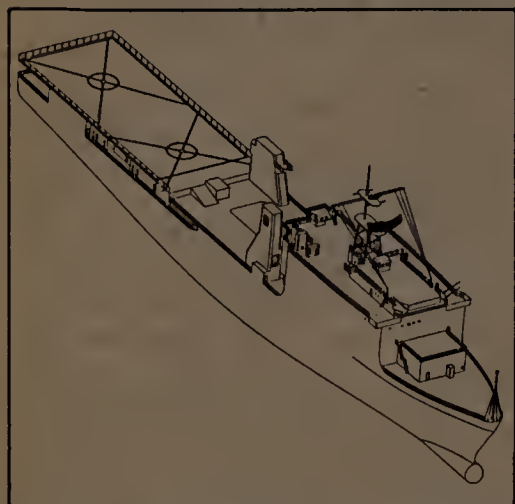
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Shipbuilder Steams Into Design With Terminal



The LSD-41, designed with computer graphics at Todd Shipyards.

(Continued from SR/41)

can often spot an obvious problem with a single glance that I might have completely overlooked otherwise."

Currently, Todd performs nearly all lofting and fairing operations with the help of the computer, saving thousands of hours of labor per year. The "fairing" process involves fine-tuning a ship's design. Traditionally, skilled craftsmen faired a design by rendering a full-scale drawing on the floor of a "loft" and adjusting the ship's lines accordingly.

"In my group, we do lofting and

fairing by computer," Lovdahl said. "Our system allows us to fine-tune our designs in much the same way as loftsmen do, except that our work is done on the CRT screen instead of on the floor."

Perhaps the greatest improvement in efficiency is that design information can be transferred electronically to wherever it is needed. "One of my engineers creates a drawing on his terminal and stores it in the computer," Lovdahl said. "I can then inspect it on my terminal."

"We can then extract manufacturing data directly from the completed design without tedious manual mea-

surements. This manufacturing data is fed directly into computerized production equipment, such as the robotic steelcutters which manufacture parts of the hull."

The graphics system at Todd Shipyards has allowed them to adapt a modular approach to ship design and manufacturing. Todd designs and builds ships in modules which are put together with assembly line techniques.

"Before, we would build the hull on land, then launch it into the water," Lovdahl explained. "At that point, the ship was only about 30% complete. In order to finish it, workmen would have to board the ship and climb down into the hull to do the outfitting."

"Now, we design the ship in 13 modules with each module already containing all the pipes, ducts, pumps and wiring that it needs. Our workers assemble the modules in an efficient, production-line manner and weld them together on dry land. By the time the ship is launched into the water, it is 75% complete and requires only minor finishing work," he maintained.

DSS Evolving As Facility For Analysis

(Continued from SR/39)

tivity analysis using either discrete or percentage changes on the input variable. Graphical "what if" analysis is also available to examine a variety of alternatives where the user knows the values that he wants to examine instead of the changes.

Graphical analysis goes one step further. One of the most powerful features of any DSS is that it allows the end user to perform goal seeking. This allows the user to have the system solve the input that is required to achieve a desired result.

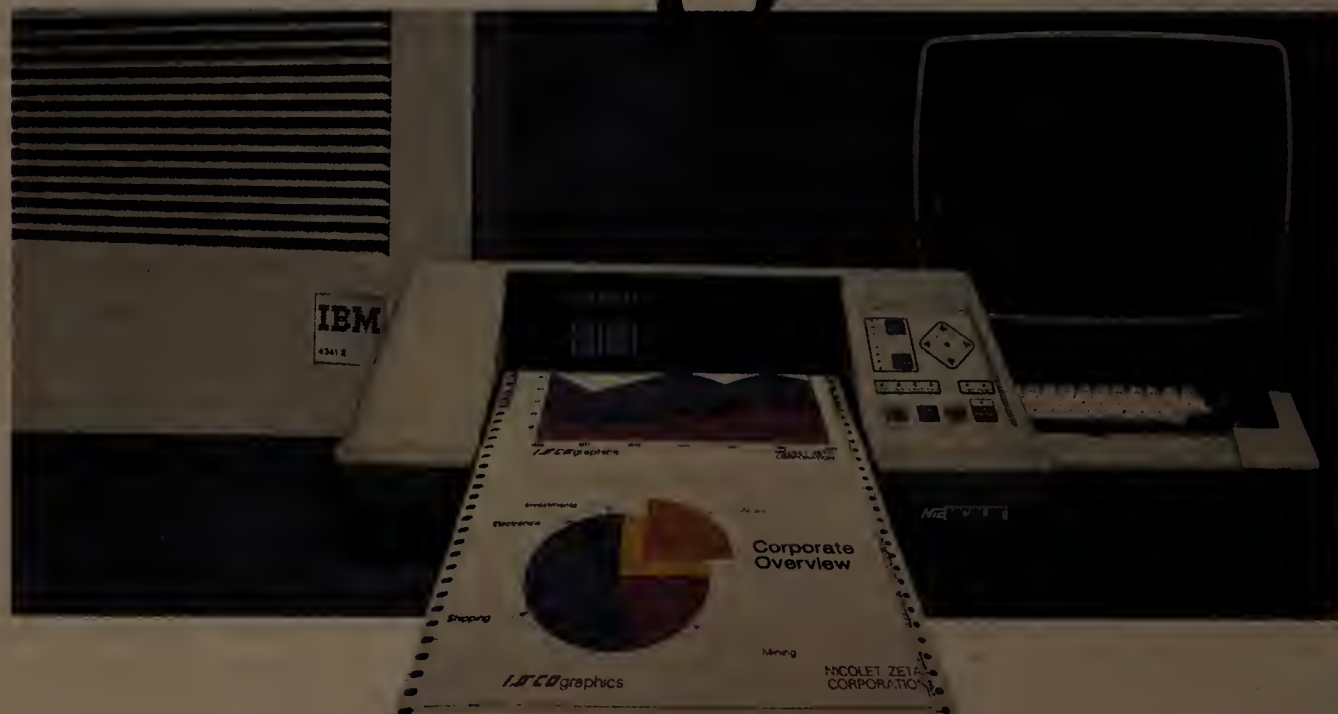
Goal seeking has also been brought into DSS graphical "what if" facilities. Graphical goal seeking is performed using cursor location keys instead of words. A user develops a base case graph using any of the "what if" features previously mentioned and then simply locates the cursor at any point on the graph. The DSS then determines the input that is required to get the result to pass through the cursor location.

Today's leading-edge office automation environments are blending graphics and DSS with word processing. This allows users to develop complete decision packages that include both text and figures.

We will soon see figure graphs and textual commentary being distributed throughout organizations by mainframe electronic mail systems as more organizations exploit the benefits of the information center.

Frankel is director of information center marketing with Applied Data Research, Inc., located in Princeton, N.J., a software firm specializing in data base products.

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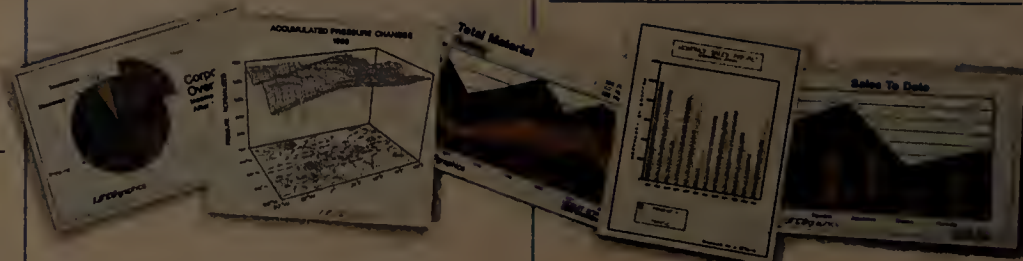
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Firm Makes Graphics Tools More Accessible to Engineers

PALO ALTO, Calif. — In spite of the growing use of computer-aided design and manufacturing (CAD/CAM) in engineering applications, computer graphics has traditionally cost too much to provide engineers with desktop access to graphics technology. Instead, graphics systems are usually available to a limited number of users for limited times.

Engineers, designers, supervisors and support personnel therefore still rely on paperwork, or charts of plot coordinators, to review products in progress. They cannot easily refer to a graphics program to follow up the progress of a project.

To view a graphics plot, most users set up the plotter and run the risk of plotting an image that is current only at the time it is produced. These restraints inhibit designers' productivity with a graphics system.

Comsat General Integrated Systems (CGIS), a corporation specializing in CAD/CAM systems, recognized the need for improving engineers' access to graphics systems.

"Just the ability to preview a plot could save the user maybe an hour's work at a time. It's much more convenient," explained James Blaschke, associate director of marketing at CGIS.

To provide this extra convenience and productivity to engineering applications, CGIS added the Autograph line of low-cost graphics terminals to the CGIS product line. The Autograph terminals, manufactured by Data Type, Inc. of Mountain View, Calif., provide economical, medium-resolution (512 by 250 lines) bit-mapped graphics for engineers' review and preview needs.

"We sell the concept of a terminal at every user's desk," said Blaschke. "CGIS supplies a wide range of integrated computer products — including local-area networks and communications processors — for engineering applications. Our more elaborate packages are completely graphical.

"The Data Type Autograph Series Terminal is perfect for those applications," Blaschke said. The Autograph is a Televideo, Inc. terminal, upgraded to provide modest graphics abilities. It allows the engineer to run a program interactively at his desk.

CGIS needed a desktop terminal to serve a multitude of functions: alphanumeric, graphics and local-area networking. Data Type was the first manufacturer to offer desktop graphics capabilities, with a low-cost interactive graphics upgrade to the Televideo terminal.

"In some cases, we sell just the Televideo terminal by itself, without the graphics," said Blaschke. "Although about one-third of the terminals we sell don't need graphics capabilities at first, later they often do, and we wanted to be able to provide the same product with the graphics upgrade."

One of the first companies to take advantage of CGIS' desktop graphics terminal was the Spacecraft Electron-

ics Engineering Activity of Ford Aerospace and Communications Corp. CGIS provided a large integrated microwave circuit design system with 75 Autograph terminals.

About half of those terminals are being used for graphics, as well as alphanumeric applications. The graphics capabilities involve microwave circuit layout and design, regular screen editing and text processing and the ability to look at plot files before printing.

Don Palmer, the principal engi-
(Continued on SR/44)



CGIS engineer uses Autograph 150 graphics display terminal.



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Food Mart Seasons Meets With T/S Graphics

TREVOSE, Penn. — The management of Genuardis, a Pennsylvania-based supermarket chain, recently found out just how powerful computer graphics can be.

Every year Genuardis conducts a meeting for approximately 250 people, including the company's store management and the administrative staff from corporate headquarters. The purpose of the meeting is to review the company's operations during the previous year and forecast future performance.

The meeting agenda includes a 40- to 50-minute presentation by company management, which until recently was unaccompanied by graphs. Last year's attendees suggested that the presentation could be enhanced by using graphs. In response, Genuardis' top management began considering the various graphics alternatives.

While Genuardis does have in-house computer capacity, the decision was made to evaluate computer graphics through a locally based time-sharing service, Neshaminy Valley Information Processing (NVIP). This was done for several reasons. Since Genuardis anticipated using graphics on a periodic basis only, time-sharing would provide a substantial cost savings in comparison to the purchase of the necessary graphics software and hardware.

Time Constraint

Genuardis was faced with a time constraint. The annual meeting was only one week away, no one in the company had any experience with

Firm Makes Graphics Aids More Accessible

(Continued from SR/43)

neer for CAD Systems at Ford Aerospace, said the Autograph terminals are saving his engineers a great deal of time in reviewing products in progress.

"Before, they had to go down a list of 400 numbers in six columns. Once they figured out what the numbers meant, they could see how far the project had progressed. Now, with the Autograph, they can see that information graphically plotted. It's obvious at a glance."

The CGIS system has been running at Ford Aerospace for about 10 months, with about 100 engineers using 30 Autograph terminals. The division also has a Calma Co. DDM Design System, featuring full-color, high-resolution graphics. That system is restricted because it has only four terminals.

"With the Autograph terminals," Palmer said, "the engineers will start making their own block diagrams with simple, two-dimensional line work. I plan to use the terminals for business graphics displays . . . We've had the terminals installed for just a few months, but I anticipate getting a lot of value from all the possible applications."

graphics software and 22 graphs were needed for the meeting.

Keeping in mind the above factors, NVIP recommended that Genuardis try Cuechart, a proprietary software product of Issco, Inc.

The Cuechart system includes a collection of standardized bar, line, pie and word charts that the user can customize to meet his needs. In addition, once a user has selected the standard Cuechart he wishes to use, the system prompts the user for the information needed to customize and complete his graph.

Once the necessary information has been supplied to Cuechart via

the prompting process, the information is converted to a format that is usable by Tell-a-Graf, another Issco product that actually produces the graph the user has designed.

The director of operations for Genuardis' supermarkets, Art Stover, and a store supervisor, Joe Fazio, were charged with developing the graphs. With Cuechart and some assistance from an NVIP marketing support representative, they were able to complete 17 line charts and five pie charts in 1½ days.

The meeting ran smoothly, and preliminary feedback from some of the 250 attendees indicated that the

graphs had been a success. Fazio said that the graphics led the audience to view him as more prepared and made his presentation more professional.

There is no doubt that graphics can enhance a presentation; however, companies that choose to use graphics should find the most cost-efficient method of doing so. In the case of Genuardis, time-sharing computer graphics proved to be much more cost-efficient than purchasing the required hardware and software.

Retaining the services of a graphics designer/artist would have been
(Continued on SR/46)

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Saves Price of Outside Printer

Graphics Equipment Cuts Costs for Analyst

BETHEL, Conn. — When financial analyst Paul Pappadio turned to computer graphics to cut the high cost of producing a large volume of graphs and charts, not only did he solve his problem, he also increased the marketability of his information.

Pappadio routinely analyzes enormous cash flows. He tracks the operational cash flow of the U.S. economy and some 500 companies for Capital Flow Trends, a service of Purcell, Graham and Co., Inc.

It didn't take his expertise in analyzing cash flows, however, to see an

expenditure that was particularly problematic: the expense entailed in producing the many illustrations needed to communicate his complicated information. This concern is basic to any of today's informational businesses whose data is sold in the form of great numbers of graphs and charts.

Equipment Purchase

Last summer, Pappadio rechanneled some of his business outlay into an Apple Computer, Inc. Apple III computer, a Hewlett-Packard Co.

7470A plotter and Chart-Master software, a product of Westport, Conn.-based Decision Resources, Inc., which produces professional-quality graphics.

The previously heavy outflow of money and time that was required to hand-draw charts has now come to a halt.

Instead, there is more information Pappadio can accommodate and more time available to evaluate it.

"The more readable my information is, the more marketable it is," he said. "These graphs show much more

clearly the relationship between what I do and a company's performance.

"Not only must portfolio managers and institutional investors evaluate huge amounts of information, but in essence they have to evaluate the evaluations I make for them. They have to be able to get a quick, concise picture of the analyses in Capital Flow Trends.

"The features available to me with this software and computer combination allow me to work up charts that communicate," he explained.

Predicting Trends

Trends in operational cash flow can show six to nine months ahead the direction and intensity of a company's earnings, Pappadio explained. They are an indicator of whether a company is pricing its products properly, considering costs during inflation or deflation.

Capital Flow Trends provides six to 10 different graphs, updated quarterly, for 100 basic companies. It also provides three sets of graphs for another 400 companies, updated semi-annually.

More than 1,000 charts per year are updated for institutional clients.

This volume would be staggering to anyone forced to spend hours creating original hand-drawn charts as Pappadio previously was doing. Now he has his draft table up for sale.

He no longer needs the services of an outside printer to achieve the quality reproduction of the previously hand-drawn work — the prime savings.

Pappadio found the Chart-Master graphics operation so cost-effective, he installed identical equipment at home.

While trimming expenses, he is able to increase his client base as well as improve service.

Time saved in producing illustrations can be spent on the statistical side.

With Chart-Master software, Pappadio can plot up to 600 bar charts and 24 variables with 8 different hatching patterns.

Values can be printed on top of bars, and bars can be stacked or clustered.

Chart-Master also produces full-color line and pie charts. Pie charts can have up to 20 slices, any or all of which can be exploded. Up to four pies can be produced on the same chart.

Values or percentages can be printed in the slices, size permitting. For line and scatter charts, there are eight different types or symbols to differentiate data. Up to 600 data points can be charted in any combination of variables.

Up to nine charts can be put anywhere on the page.

Charts can be produced on paper or transparencies.

Another asset is that the computer graphs can be photocopied and do not require an outside printer, Pappadio pointed out.

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Mark Sunday, Mostek Corp.'s operations planning systems manager, reviews a bar chart.

Device-Independent Aids Bring Graphics to Users

CARROLLTON, Texas — Utilizing a pair of device-independent graphics software tools packages, programmers at a semiconductor house here have rapidly built a broad range of business graphics capabilities for more than 50 end users in the company's Operations Planning and Marketing departments.

According to Mark Sunday, operations planning systems manager at Mostek Corp., the DI-3000 and Graf-maker packages from Precision Visuals, Inc. of Boulder, Colo., have permitted the implementation of nu-

merous bar charts, line graphs, structural charts and text presentations for output on a wide variety of graphics devices.

"With only a minor programming effort, requiring less than six man-weeks, we have achieved a series of powerful graphics capabilities," Sunday said. "End users cannot only easily create and modify their own graphics for review or presentation purposes, but they can also readily access detailed information from our corporate data base and have that data plotted automatically. In all cases, users can employ any of several graphics hard-copy devices, just as they would a conventional shared line printer."

Founded in 1969, Mostek is a broad-based semiconductor manufacturer that builds memory, microprocessor and telecommunications components and subsystems for both military and commercial applications. With 7,000 employees, the firm is a wholly owned subsidiary of United Technologies Corp., the seventh largest manufacturing company in the U.S.

Graphics end users in Sunday's department can generate graphics output through four different systems. The first is a program for creating and modifying bar charts and line graphs. This program defines eight basic graph or chart formats, each of which is modifiable from a terminal via a single-screen user interface, Sunday said.

A second system, called Chart-maker, permits the user to construct a structured chart by placing predefined symbols, such as flowcharting symbols, on a grid on the screen and connecting the symbols with lines. This system is used to generate charts

(Continued on SR/48)

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Meets Improved With Graphics

(Continued from SR/44)

an alternate way of producing the graphs. A comparison was made between the cost of the graphs and the time needed to produce them at NVIP using Cuechart vs. the time required and the estimated cost of the same graphs produced by a graphics artist.

Based on a cost estimate provided by the director of a local art department, the computer graphs developed by Fazio and Stover cost approximately 23% less to produce than they would have if an artist had drawn them.

In addition, Genuardis expects to see a return on its initial investment in the graphs. As a computer user gains more experience, he becomes more proficient and makes more efficient use of the computer system. Accordingly, the amount of computer time and resources required to do the same or a similar application is reduced, as is the cost. This is not likely to be the case with graphs drawn by a graphics artist.

*Many Can View Info Simultaneously***Graphics Display Systems: A Major Step Forward**

By Bart Van Cromvoirt
Special to CW†

Computer graphics was once a technology advocated and used by only a handful of pioneering organizations and individuals, particularly those involved in design engineering. Now it is found in the boardrooms and on the agendas of America's largest and best-known corporations.

A market analysis study from Creative Strategies International, Inc. predicted explosive growth in the computer graphics market, with sales reaching \$17 billion by 1987. Another report, issued by International Data Corp., stated that graphics software is one of the fastest growing segments of the general software marketplace, due in part to the growth of graphics software packages for desktop computers.

In many business areas and professions, color computer graphics are moving into the mainstream of data processing. Business people are finding that computer graphics improves productivity because it speeds the communication of important information. The strategic use of pies, bars, horizontal bars, lines, points and areas can transform stacks of data sheets into clearly visible representations that facilitate quicker comparison of relevant data.

Major Improvements

Coupled with the growth in computer graphics has been the recent development of graphics display systems, which are major improvements over the traditional mediums previously used for group presentations of computer-generated material.

Before the development of projection systems, there were essentially two methods of sharing data. The first and most common was hard-copy output — daisywheel, matrix, thermal transfer — and the more recent laser-based printers for viewing data. For certain applications, pen plotters, like those manufactured by Gould Corp. and Hewlett-Packard Co., facilitated the display of graphics and diagrams.

The advantage of hard copy is that it can be distributed to more than one person. However, any changes in the original text or diagram — the result of a suggestion at a meeting for example — requires additional printing to incorporate the changes. As a result, precious time is wasted.

A second method of communicating computer data and graphics to a group is the use of multiple screens, where everyone has simultaneous access to a screen. This is cumbersome, difficult to set up and somewhat limiting because of the small number of people it can adequately serve.

Simultaneous Viewing

Graphics display systems are a major step forward because they allow everyone in a group to view computer information at the same time. This eliminates the need for printing and copying. The impact this medium

gives to graphics, particularly color graphics, is extraordinary.

One of the most important and useful features of computer display systems is the ability to project computer graphics information on-line. This is a big advantage over hard copy or multiple screen use.

With a graphics display system, changes in material can be input and viewed instantly. Group response time is reduced to seconds. For example, a manager or team leader using a decision support software package to make "what if" projections in a

group presentation can input suggestions as they arise. The results of the changes and their impact are viewed immediately.

Graphics display systems, the portable models, in particular, have a multitude of other applications, including training and education, design engineering, group performance evaluation, diagnostic imaging, sales analysis, marketing and teleconferencing. Some more examples include:

- Business meetings in which financial data is developed and dis-

cussed and used for group decision making.

- Education for classroom presentations in science, engineering, business or computer training.

- Technical presentations in which a group of engineers meet to review designs and group input is needed.

- Sales presentations, where new products and services need to be evaluated and compared.

- Teleconferenced meetings.

- Internal evaluation meetings,

(Continued on SR/48)

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BPS Business Graphics quickly gives you professional-looking graphs in a wide variety of formats, so you can make colorful presentations on your monitor. And since the program works with more than sixty popular printers and plotters, you can get high-quality paper copies of your graphs, and even overhead transparencies.

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A Hard Look at Graphics Display Systems

(Continued from SR/47)

where a division or department's performance needs to be reviewed.

• Diagnostic imaging in which CRT terminals play a major role in radiology, nuclear medicine and ultrasound diagnosis.

Lens Systems

There are, essentially, five major vendors offering this type of graphics display system. Some are one-lens systems, as opposed to the more common, traditional three-lens systems used in large-screen television.

Three-lens systems project three images at the screen — one red, an-

other green and the third blue. In order to produce a sharp picture, all three images must converge at precisely the same distance from the lens. This makes setup an exacting and time-consuming process.

Some of the three-lens, commercial systems feature a brighter picture than the one-lens projectors. This advantage is offset, however, due to the three-lens arrangement, which limits the accuracy of color convergence. Because convergence in three-lens projectors is often less than perfect, a fuzzy, slightly unfocused picture can result.

One-lens systems converge the

three images inside the monitor's casing, combining them into a single-image there. The result is a high-resolution, well-converged picture. These systems are easily set up and portable, which allow the user to present data whenever and wherever it will make the most impact.

All five have the ability to project graphics and data from videotape, videodisk and computer terminals, although some require elaborate interfacing equipment.

Van Cromvoirt is manager of projection marketing at Electrochrome Ltd. in Kitchener, Ont., Canada.

Device-Independent Tools Used to Expand Graphics Use

(Continued from SR/46)

documenting data flows within pro-

grams and to create organizational and other general-purpose charts.

A third system accessible to end users is known as the Presentation Manager. This textual foil presentation management system permits users to key in the text of their presentations and to select type fonts, colors and sizes by tabbing the cursor through options in fields on the screen. Successive pages of a presentation can be output in the form of continuous transparencies.

In addition to these stand-alone graphics programs, users can at any time produce graphic representations through a number of inventory and sales analysis applications programs. These programs gather data from the corporate data base and automatically generate stacked line charts or comparative bar charts. The entire range of these charts is also generated by a batch program once a week and distributed to the managers of the Operations Planning Department.

Of these four graphics-oriented systems, the program for generating user-created bar charts and line graphs is based on the Grafmaker package; the other systems are driven by DI-3000.

Mostek's Operations Planning Department employs a Digital Equipment Corp. VAX 11/780 to run its graphics-based systems. The department currently utilizes 64 DEC VT100 terminals, three VT125 terminals, two Hewlett-Packard Co. 7220 pen plotters, two HP 7221 pen plotters and three DEC LA34 dot matrix plotters.

Before the installation of the Grafmaker and DI-3000 packages, end users in Sunday's department relied heavily on skilled production personnel and secretaries to aid them in creating their charts, graphs and text presentations.

"Preparing simple text presentations alone was tying up a lot of managerial and secretarial time," Sunday said. "Despite the effort required, these presentations generally lacked the quality of computer-generated graphics. We needed a way to speed and simplify the production of our end-user graphics, as well as to upgrade their quality," according to Sunday.

After a brief assessment of the available graphics software tools, Sunday selected the Precision Visuals packages in February 1982 because they offered a simple means of interfacing device-independent graphics routines with the company's applications programs.

New from Interactive Systems/3M:

The first high-speed broadband local-area network that guards against data crashes.

If you've been thinking of investing in a contention network, consider this: How do you guard against data crashes during times of heavy system use?

Answer: You don't, because contention schemes simply don't provide any kind of data insurance.

Fortunately, there is a new type of network that does protect against data loss. It's called 3M Videodata® LAN/1. And it's the first intelligent broadband local-area network that's designed to get data through on time, no matter how much traffic is on the cable.

Videodata® LAN/1: The efficiency of token-passing plus the proven flexibility and expandability of broadband.

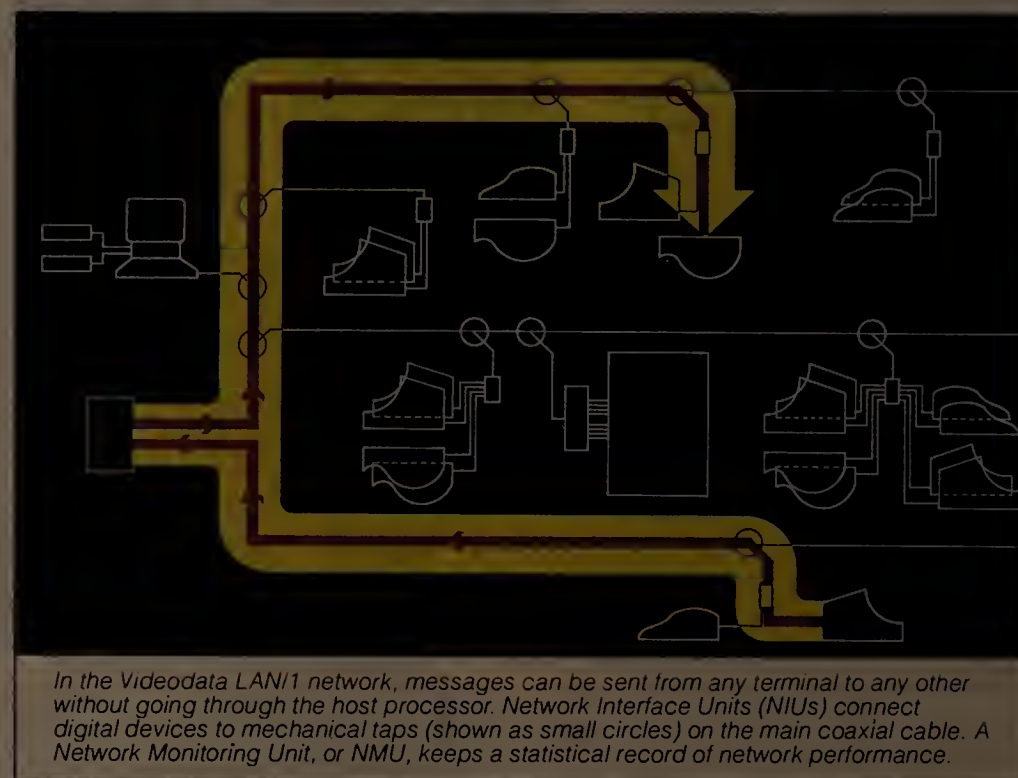
Token-passing networks eliminate contention troubles and data crashes by passing an electronic "token" from terminal to terminal. When a terminal has to transmit, it grabs the token and sends data packets to the receiving device. Receipt is acknowledged and the token is automatically released to continue its rounds. Because the system assigns a network entry address to each user, everyone has an opportunity to send data during each token cycle.



Because Videodata LAN/1 is a broadband system, dedicated channels can be used for full-motion video applications such as CAD/CAM and teleconferencing. These video signals are kept entirely separate from digital traffic on the network's token-passing channels.

So far, so good. But most token-passing networks are baseband systems, meaning that terminals must share a common channel as they would in a typical contention network. This can limit speed and capacity in some applications.

LAN/1 overcomes this possible limitation by combining token-passing with a proven broadband



In the Videodata LAN/1 network, messages can be sent from any terminal to any other without going through the host processor. Network Interface Units (NIUs) connect digital devices to mechanical taps (shown as small circles) on the main coaxial cable. A Network Monitoring Unit, or NMU, keeps a statistical record of network performance.

technology that allows many channels to be put on a single cable. The payoff: higher channel speeds, ranging up to 2.5 MB/s over a maximum seven-mile radius, with terminal data rates of up to 19.2 KB/s. Plus a capacity of up to 10,000 devices to allow plenty of room for future expansion.

Self-monitoring, with a printed record of network performance.

LAN/1 gives statistical proof of its own performance in printed form, thanks to a microcomputer-based Network Monitoring Unit (NMU). This unit, which also helps in routine maintenance and troubleshooting, may be used for remote monitoring as well.

Separate channels for voice, video, and graphics. Plus the ability to work in point-to-point applications.

Because LAN/1 is a broadband network, channels can be set aside for real-time voice, video, and high-speed graphics. This can be done without compromising digital traffic capacity.

LAN/1's broadband design also permits flexibility in network architecture, so that it can be used in high-speed point-to-point applica-

tions which can't be served efficiently with contention systems.

Other benefits include full transparency, an automatic shut-off feature to keep any one terminal from capturing the token, and compatibility with both dumb and intelligent terminals. The list of features goes on and on.

For the full story on the new Videodata LAN/1 network from Interactive Systems/3M, call 800-328-1684 toll free. (In Minnesota, 800-792-1072.) Or mail the coupon.

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SPECIAL REPORT

Page 49
July 25, 1983

DP Graphics in Mid-Cycle, In Rapid-Growth Stage

By Stephen E. Coit
Special to CW†

All high-technology products go through a three-stage life cycle: the development stage, the rapid-growth stage and the maturity stage.

Computer graphics is still in the second stage. Three factors characterize the graphics market at this stage: falling hardware prices, increasing functionality and performance and improving image quality.

It is not merely the price of memory that is falling. So are logic circuits, video displays and interfaces. In fact, the only parts of the computer graphics system that are not getting less expensive are packaging and power supply.

At the same time, the newer devices are faster and offer windowing, alphanumeric scrolling, improved interactive device control and new ways to use image memory. In addition, graphics image quality is improving because ways have been found to make pictures sharper (such as using color and antialiasing) and to eliminate screen flicker.

Varied Applications

The effect of all these factors is that many more people are buying graphics systems, and they are using them for more varied applications.

We believe that when a technology is changing as rapidly as computer graphics is changing today, two things ought to happen:

- Suppliers should concentrate on what they do best.
- Purchasers should not backward integrate.

Although many graphics suppliers are subtly trying to become computer systems suppliers (for example, offering their own general-purpose applications processors, operating systems and peripherals), it is believed that the two technologies — graphics and computer systems — are simply moving too fast for that to be a wise move. Providing the best graphics product in a rapid-growth

market is a full-time job.

The implication for graphics users is clear: Buy graphics from a graphics company; buy computers from a computer company.

Professional workstations with graphics have to be compatible with entirely existing corporate data processing systems.

A graphics workstation with its own microcomputer-based processor, its own operating system and a nonstandard networking protocol can make system-level integration a nightmare.

Graphics users should choose systems on the basis of their applications, whether that means a lot of data base management capability, a lot of data communications capability or mainframe compatibility. They should separate the choice of a graphics display device from that of an applications processor.

By selecting the applications processor and the graphics processor independently, users simplify system-level integration. Another benefit is that applications software will be more portable. As computer systems and graphics technologies evolve independently over the next few years, users will be able to choose the best of each technology for new installations.

Coit is director of marketing for Raster Technologies, Inc. of N. Billerica, Mass.



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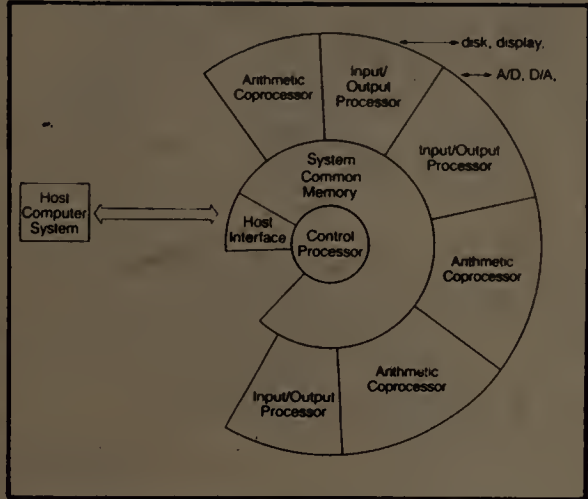
FPS-5000 Array Processors Unveiled by Floating Point

BEAVERTON, Ore. — Floating Point Systems, Inc. (FPS) has unveiled a family of array processors said to provide three to six times the performance and four times the memory capacity of FPS' previous 38-bit product line.

The FPS-5000 series consists of four basic product groups — the 5100, 5200, 5300 and 5400 — that reportedly range in peak performance from 26 million floating-point operations per second (Mflop) up to 62 Mflop. Through a combination of a distributed architecture concept and state-of-the-art very large-scale integration technology, the 5000 series has realized a price/performance that is a threefold improvement over previous FPS products, the vendor said.

Optimum performance is achieved through a distributed processing system containing high-performance co-processors. Each co-processor is a complete 32-bit floating-point array processor with its own local memory and control capability. The internal architecture contains two floating-point adders and a floating-point multiplier. With a 6MHz internal instruction cycle time, the 18 Mflop performance reportedly yields a 1,024-point complex fast Fourier transform time of 2.7 msec. Independent local memories and multiple addressing processors in the units ensure that each processor functions at peak performance.

The new higher performance array pro-



FPS-5000 Series System Architecture

cessors are intended to appeal to the signal/image processing community for application development. All host computer interfaces currently supported on the FPS 38-bit array processor line will be available for the 5000 series. Those interfaces include the Data General Corp.'s Eclipse series; Digital Equipment Corp.'s VAX-11 and PDP-11 series (Unibus); Gould, Inc.'s S.E.L. 32 series; Hewlett-Packard Co.'s HP 1000 systems series; Prime, Inc.'s 50 series; Perkin-Elmer Corp.'s 3200 series; and Harris Corp.'s line of superminicomputers.

The array processors function either under the direct control of the host or as a "load and go" or some combination of the two. Also, software available for previous
(Continued on Page 74)

Card Reader Bows For System/36

FRAZER, Pa. — Cardamation Co. has unveiled an 80-col., medium-speed punched-card reader system designed for the IBM System/36.

The CR200/36 reportedly includes a 200 card/min reader, an IBM 3780-compatible bisynchronous controller and a software handler written in RPG-II.

The CR200/36 is priced at \$6,500, including software handler. A three-year lease costs \$245 monthly. Maintenance is priced at \$90/mo, according to the vendor.

Cardamation can be reached through P.O. Box 746, Frazer, Pa. 19355.

Electronic Filing System a Cure for Hospital

YOUNGSTOWN, Ohio — Micrographics and data processing experts at St. Elizabeth's Hospital Medical Center here are cooperating to blend their areas of expertise into a single electronic filing system to serve patients and medical and administrative staff better.

The 756-bed hospital has benefited from such diverse results as faster handling of inquiries for patient billing and doctors' accounts; viewing of microfilmed electrocardiograms (EKG) in operating rooms, eliminating the former damage and misfile problems when EKG originals were used; and more up-to-date and easier-to-access medical records related to pharmacy and lab operations, now imaged on computer-output microfiche.

Also, full-tilt use of microfilm has freed 5,162 square feet of space for the Roman Catholic nonprofit hospital, valued at \$465,000 with current hospital building

costs running at \$90 per square foot. The movers and shakers behind the development of an electronic filing system are Jack Farmer, assistant director of fiscal services, and Dennis Vari, director of electronic DP. They have sparked the development of an on-line index and a microfiche index to microfilm images. Eventually, all hospital micrographics applications will be brought on-line.

When Farmer arrived at the hospital in 1965, he discovered that the patient billing/accounts receivable documents were microfilmed by an outside service company and that the retrieval system was cumbersome. Also, a lack of order made it difficult to locate document images.

To effect a cure, Farmer contracted with a service bureau to microfilm receivables documents annually and to provide a primary alphabet index. However, this solu-
(Continued on Page 72)



Microfilm images can be viewed on the Kodak IMT-150 microimage terminal.

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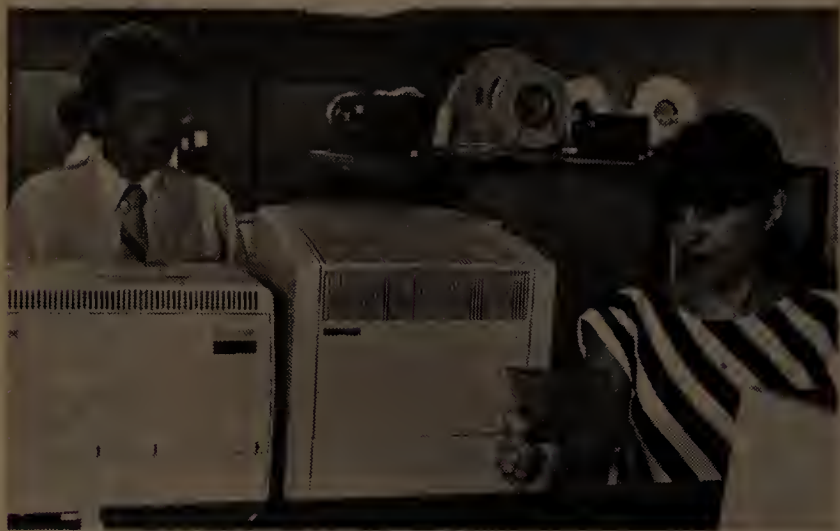


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On-Line System Effects Cure for Hospital's Files



Marcia Capela looks at a microfiche original produced by the Kodak Komstar 100 microimage processor.

(Continued from Page 71)

tion involved too much work and proved to be only marginally better than the hospital's previous efforts. A trip to Kodak Corp.'s Cleveland office in 1979 turned things around.

While Farmer was envisioning an in-house micrographics system, the DP department was busy installing a Kodak Komstar 100 microimage processor, which uses a laser to image data on microfiche formats. Installed in September 1980, the hospital now uses Oxford Software International Corp.'s User Files On-Line software package, which provides an on-line interface between its twin IBM 4341 computer system and four Kodak IMT-150 microimage terminals.

Credit/billing staffers at any of 18 on-line data entry/display terminals can request microfilmed information. Requests are held in computer memory until an operator of a microimage terminal asks the computer to display

on the CRT a microfilm request list, which gives the patient name and number and displays the magazine and image frame numbers of needed document images. It also identifies the requesting CRT terminal and time of request.

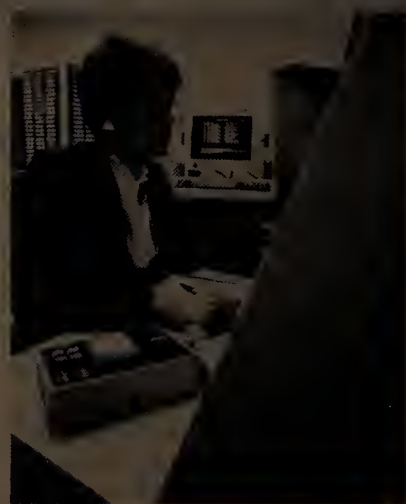
The operator inserts microfilm magazines in order shown on the CRT, and the computer prompts the IMT-150 microimage terminal to drive the microfilm to the needed image frame.

"Now we can turn reports around in a day that used to take a week to produce when printing time had to be scheduled," Vari said. "Users have information right there when they need it. The Komstar unit creates an average of 50 microfiche daily, or the equivalent of about 10,000 pages of computer printout," he added.

Also, the space savings are said to be monumental. Information that used to be printed on more than 200 pieces of paper is now on

one 4-in. by 6-in. microfiche that can be locked away in an index file cabinet, Vari said. In addition, the Komstar unit creates microfiche indexes for documents imaged on 16mm roll microfilm — another link in the electronic filing system.

Accounts information is stored on-line for one year from last paid date, at which point it is output to computer-output microfilm.



St. Elizabeth's Hospital Medical Center's on-line microfilm data base.

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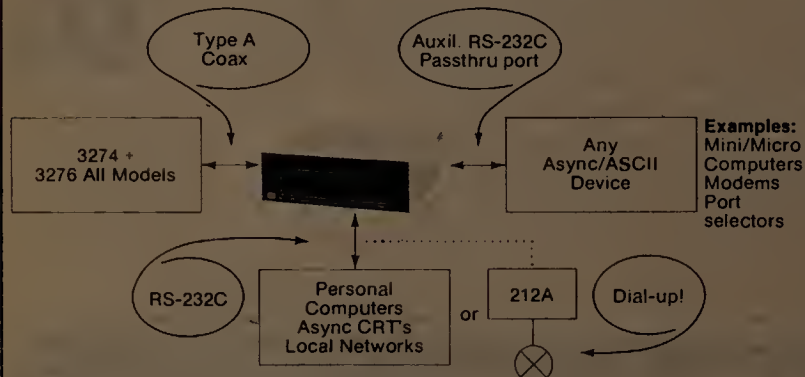
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Floppy Disk Drive Subsystems Boast Backup for IBM Micros

CANOGA PARK, Calif. — I² Interface, Inc. has introduced a series of 5¼-in. Winchester and half-height floppy disk drive subsystems that reportedly provide backup drive to the IBM XT or additional storage devices for either the IBM Personal Computer or XT.

The Winchester disk systems — designated the I²BM-10X, -15X and -25X — are said to provide 10.6-, 15.9- and 25.1M bytes of formatted storage, giving Personal Computer and XT users the performance capabilities of a minicomputer. Each disk drive system is compatible with IBM 2.0 DOS (unmodified) and includes a 5¼-in. Winchester drive, an IBM-compatible controller (if required), cabinet, cable, power supply, connector and I/O adapter. The I²BM-10X and -15X have an average track-to-track access time of 85 msec, and the -25x has a time of 54 msec.

The I²BM-2X dual half-

height floppy disk subsystem delivers 720K bytes of formatted storage and was designed to be mounted internally on the XT.

Starting prices are \$1,285 for the I²BM-10X, \$1,595 for the -15X and \$2,295 for the -25X. Suggested retail for the I²BM-2X is \$535. I² Interface is located at 7630 Alabama Ave., Canoga Park, Calif. 91304.

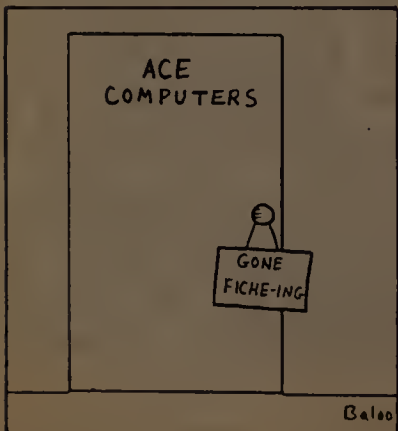
FPS Unveils Updated Line Of Processors

(Continued from Page 71)

FPS array processors is compatible with the 5000 family. Software support developed for the FPS-100 and AP-120B products is maintained and users are able to move existing applications onto the FPS-5000 series with minimal effort.

The 5000 series is offered in a base configuration that includes 256K words of data memory, 12.5K words of table memory, a general-purpose control processor and a single floating-point co-processor. Depending upon the model, the program memory is upgradable to 512K words or 1M word. The 5300 models provide up to two co-processors, and the 5400 models allow expansion to three co-processors.

System prices for a typical 26-Mflop unit start at \$60,000. The 62-Mflop top-of-the-line model is priced under \$100,000. FPS is located at 3601 S.W. Murray Blvd., Beaverton, Ore. 97223.



Said to Supply Multiple Colors

Multimode Printer Introduced

CHATSWORTH, Calif. — Anadex, Inc. has introduced a multimode printer said to produce multiple colors in four modes that include enhanced, correspondence and data processing quality, as well as high-resolution graphics.

The DP-9725A Color/Scribe printer reportedly achieves printing versatility by single- and multiple-pass

modes that permit full-color capabilities and multiquality characters. Color printing includes a four-color ribbon having yellow, magenta, cyan and black bands. The printer can change colors at any point in a printed line.

Single-color printing for correspondence quality is 50 char./sec at 10 char./in., 60 char./sec at 12 char./in. and 55 char./sec with propor-

tional spacing. In the enhanced quality mode, speed is up to 164 char./sec for 10, 12, 15 and 16.4 char./in.; it is 200 char./sec for DP quality.

Graphics include bar charts and curves in various colors.

In single quantities, the DP-9725A lists for \$2,350 from Anadex, located at 9825 De Soto Ave., Chatsworth, Calif. 91311.

R&D had certain requirements that had to be met; manufacturing, accounting and marketing had others. Then microcomputers started showing up on desktops, with modems and printers here and there. Now you face the task of making it all work together. Sharing resources. Sharing information. And making more effective use of the information processing equipment you've already invested in.

NET/ONE LEAVES YOU IN CONTROL OF EQUIPMENT DECISIONS.

Net/One® is a general purpose communications system that turns equipment from different vendors into a fully functional, fast, powerful, information processing network. Because it can connect equipment from virtually any vendor, you remain free to choose equipment based on capability, rather than compatibility.

Off the shelf, Net/One supports industry-standard equipment interfaces—Async, Bisync, SDLC, through RS-232, V.35, RS-449 and IEEE-488 — as well as many high speed parallel interfaces. The list is expanding every month. But if you have special equipment that isn't in that list, Net/One is the only local area network that's fully programmable at every level so special interface protocols can be added now, or when you need them, later.

BROADBAND, BASEBAND, OR ANY COMBINATION THEREOF. YOU CALL THE SHOTS ON MEDIA, TOO.

Net/One is the only local communications system that gives you the option of broadband or baseband or a combination of both, with architecture that will allow you to add other media such as fiber optics in the near future.

YOU DON'T HAVE TO KNOW EXACTLY WHERE YOU'RE GOING TO BUY A NETWORK THAT WILL GET YOU THERE.

Everything about Net/One has been designed to respond to your needs, as they evolve, and to remain fully adaptable to evolving communications technology. System architecture is completely modular, so it can grow at the

Net/One turns the eq now into the network

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Harris Unwraps 16-Bit Micro With Cmos Tech

NEW YORK — Harris Corp. unwrapped what it is billing as the industry's first 16-bit microprocessor employing Cmos technology here recently.

The 80C86 chip, which is a Cmos version of Intel Corp.'s widely used 8086 chip, requires only 10% of the power needed to operate N-Channel Metal Oxide Semiconductor (Nmos)-based chips and will run "for weeks" on

button-cell batteries, a spokesman said.

Besides the lower power requirements, the chip has a decreased sensitivity to electromagnetic noise, can operate over a broader temperature range (55° to 125° Celsius) and produces less heat than Nmos-based chips, which increases its reliability and life expectancy, the spokesman related.

"As a result of the inher-

ent advantages of Cmos technology, marketshare for Cmos microprocessors is expected to grow at an even faster rate, from approximately \$100 million this year to an anticipated \$1 billion in 1988," said Jon E. Cornell, vice-president group executive in charge of Harris' semiconductor products group.

Harris' delivery of the 80C86 finishes off their half

of a "technology-exchange agreement" it signed with Intel in 1981. The agreement called for the exchange of design and test information that would result in functional and software compatibility between the 8086 and 80C86 families. The agreement also calls for Intel to manufacture 80C86 and associated Cmos peripheral circuits.

Because this first venture

proved successful, Harris said both companies are considering extending the agreement to cover other products.

The chip's price range starts at \$31.25 for the 5-MHz commercial temperature version and goes to \$266.66 for the 5-MHz military model when ordered in quantities of 100.

System Out For Hotels

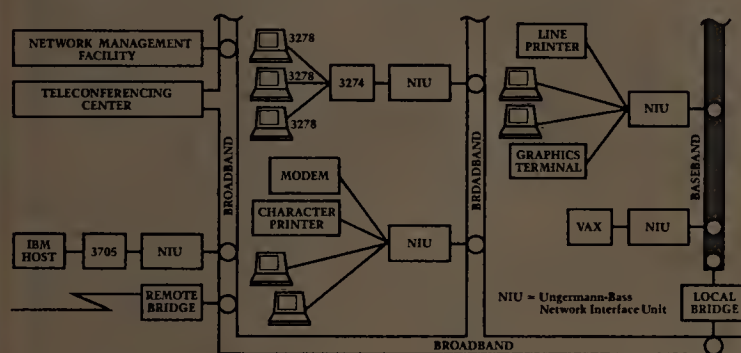
MINNEAPOLIS — Honeywell, Inc.'s Commercial Division has announced a hotel/motel management information system said to control room management, telecommunications, energy management and life safety.

The System 80, developed by Tele-Graphix, Inc., combines Honeywell software and hardware with the Tele-Graphix system. It also provides microprocessor-based monitoring of housekeeping and room attendant control and guest room and public-area energy control.

For a 150-room facility, the System 80 costs about \$66,000. Honeywell is located at Honeywell Plaza, Minneapolis, Minn. 55408.

same time and in the same direction you do. Regardless of the direction that turns out to be.

When separate divisions within a company or a campus need to share resources, one Net/One system can be bridged to others, and to remote networks. These bridges can interconnect baseband, broadband, or Net/One systems that include both. And like vendor independence and media independence, this bridging capability is available now from Ungermann-Bass.



NOW, THE IMPORTANT DIFFERENCE BETWEEN TALKING A GREAT NETWORK AND DELIVERING ONE.

We've been installing Net/One since July of 1980. Hundreds of our systems are already out there moving information for people like Control Data, Caltech, Fairchild, ITT, RCA, Boston University, U.S. Forest Service, and Ford Aerospace.

So we can do more than talk about what you need in a local area network. We can actually deliver one, now. And we can refer you to a long list of customers who are actually using one (or two or three) now.

Let's talk about how to turn the equipment you have, now—whatever it is—into the network you want, now. And the network that can take you wherever you want to go from here. Net/One.

Ungermann-Bass, Inc., 2560 Mission College Boulevard, Santa Clara, California 95050. Telephone (408) 496-0111.

Net/One from Ungermann-Bass



Clarification

International Data Corp.'s study of vendor service organizations described in "HP Customer Service Ranks High: Study" [CW, July 4] was an attitudinal survey of 302 users, overwhelmingly of IBM equipment (123). Many user samples were very small, possibly leading to misleading conclusions. The numbers of other users surveyed were as follows: Digital Equipment Corp., 29; Hewlett-Packard Co., 24; Burroughs Corp., 18; Wang Laboratories, Inc., 14; Data General Corp., 11; Honeywell, Inc., 9; Prime Computer, Inc., 8; Texas Instruments, Inc., 8; NCR Corp., 6; Basic Four Corp., 4; Control Data Corp., 4; Sperry Corp., 3; Inforex, Inc., 2; Microdata Corp., 2; Perkin-Elmer Corp., 2; Qantel Corp., 2; other, 8; user self-maintenance, 3; third-party, 11; Sorbus, Inc., 11.



equipment you have
k you want. Now.

Two Ways Of Transforming Micros & ASCII Terminals Into Full Screen 3270's



With More Hardware... Or With Simware

Everyone knows the problems involved with protocol conversion: the non-standard hardware; the service calls; the maintenance headaches; expensive modems; not to mention the time it takes to install and customize. Who needs the hassles!

Isn't there an alternative? Now there is!

SIM3278 is just one of the many products offered by SIMware Inc. The unique low cost software solution converts micros and ASCII devices to display terminals running under VM, MVS and similar full screen IBM 3270's and without requiring system modifications or hardware. That's what SIM3278 does. It's the only software solution to 3270 mode emulation.

Now SIMware announces SIM3278V MAM to complement the highly successful SIM3278 version for VM users. The new VME version has the ability to integrate into VME networks plus several unique features and options to enhance user productivity.

SIM3278 offers...

- Low cost
- No additional hardware
- Installs in just minutes
- Now for MVS and VM
- Full support for IBM Personal Computer including file transfer from 3270 mode

SIM3278 is much more than just a protocol converter. It offers many extra features no hardware converter can provide. Such as Online Help and a Session Manager that allows up to five concurrent full screen sessions by each user. The Session Manager even supports real 3270's as well as ASCII terminals while using even less system resources than ever before.

SIM3278 is in use at over 750 user sites.

Let's face it, the fact is if you had a choice between hardware and software, you'd choose software. SIM3278 offers simplicity, reliability, protocol conversion without you choosing. Take the SIMware challenge. You just won't lose. You'll convert your micros to 3270's and deliver a real 3270 experience. Call for a free evaluation. Give SIMware a call for pricing and technical details. See us at COMDEX '85, Booth 143.

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SIM3278 is also available from Simware Ltd. in the United Kingdom and throughout North America.

Simware Inc. was formerly known as Simware Computing Inc. and is a wholly owned subsidiary of Simware Machines Corp. Any possible confusion with Simware Data Systems is hereby disclaimed. Simware is a corporation.

Housed in One Enclosure

Zeus 4 Micro Enhanced to Support Eight Users

By Jeffrey Beeler

CW West Coast Bureau

MOUNTAIN VIEW, Calif. — A four-year-old microcomputer supplier has enhanced one of its low-end systems to enable the product to support as many as eight users simultaneously.

Prior to the enhancement, OSM Computer Corp.'s Zeus 4 micro system could support a maximum of four concurrent users, with a choice of one- and two-user configurations also available.

Although it competes heavily with single-user micros, Zeus 4 duplicates many of the functions of a familiar time-shared mini. All the system's central processing power, main memory and mass storage are housed in one enclosure occupying less than a cubic foot of desk space, according to an OSM spokesman.

Within the enclosure is room for as many as eight Zilog, Inc. Z80A microprocessors and an equal number of 64K-byte random-access memory (RAM) modules. One Z80A and one RAM module are dedicated to each of the system's users, who now can attach up to eight Ascii terminals to the central box at the same time, the spokesman said.

In a fully expanded configuration, Zeus 4 costs only a third as much as a comparable cluster of eight single-user micros, the source said. Unlike personal computers, the system also supports up to seven concurrent printers, provides tape backup and features a record-locking capability

that reportedly safeguards data integrity by preventing multiple users from operating simultaneously on the same file.

The record-locking feature, which is more closely identified with time-shared minis than with personal computers, is made possible through OSM's Multi-User System Executive, a superset of Digital Research, Inc.'s CP/M operating system.

Intended to be sold directly to large national accounts, Zeus 4 supports the 3270 data communications protocol, which permits the system to exchange information with IBM or IBM-compatible host mainframes. The system also provides serial ports

that permit the attachment of IBM and Apple Computer, Inc. personal computers, the source said.

To upgrade a Zeus 4 system to its next largest configuration, users need only insert additional printed circuit boards. The same hardware modularity that simplifies expansion also eases maintenance, the spokesman said.

As a further aid to maintenance, OSM has recently signed RCA Corp. to a service agreement under which RCA will provide Zeus 4 users with 90 days of free hardware repair.

Zeus 4 lies at the bottom of OSM's microcomputer systems product line, whose other members include the

Zeus 1, 2 and 3. Both the Zeus 1 and 2 support a maximum of 32 concurrent users, in contrast to the Zeus 3, which accommodates the same number of terminals as the Zeus 4.

In addition to their microprocessors and main memory, the Zeus 4 configurations incorporate a hard disk module, with a choice of four capacities ranging from 6M to 25M bytes. The configurations also come with an integrated floppy disk unit capable of storing 1/4-, 1/2- or 1M byte.

An eight-user Zeus 4 configuration costs \$8,595 and will be available in late September from OSM at 665 Clyde Ave., Mountain View, Calif. 94043.

Micro Option Introduced For Workstation

ORLANDO, Fla. — Systeme Corp. has added an option to its Universal Workstation said to add personal computing capability to the existing workstation for any Financial Information and Control System customer. It will then support a number of Digital Research, Inc. CP/M-based software packages, according to the firm.

Systeme has also contracted to become an authorized software center for Peachtree Software, Inc. software. Systeme will market and support a variety of Peachtree's personal computer packages through its Personal Computer Option.

The Personal Computer Option consists of four major components: dual diskette drives that utilize 5-in. floppy diskettes, two-sided, double-density at 48 track/in.; memory programmable read-only memory in the vendor's V3XX; key-top changes in the V3XX keyboard; a system diskette that contains the CP/M operating system and some utility programs; and a CP/M operator's manual.

The software is licensed to a specific V3XX/V13XX and may not be used on any other model.

The Personal Computer Option costs \$1,950 from Systeme, 3443 Parkway Center Court, Orlando, Fla. 32804.

IMS ENHANCEMENT SERIES

LOGPLUS provides fast, efficient, automatic IMS restart. Operator intervention is reduced to a start command. LOGPLUS also makes IMS on-line log tapes obsolete by writing to disk and managing their constant reuse. LOGPLUS is proven in over 150 installations worldwide.



"Logplus reduces IMS restart time while eliminating operator intervention."

—WAYNE WEIKEL
BMC Product Development

The 3270 OPTIMIZER compresses IMS messages. Most users report 25% or more compression. Shorter messages mean reduced line utilization and faster response time. Hundreds of installations worldwide.



"The 3270 Optimizer reduces line utilization for faster response time."

—DAN CLOER
BMC Product Development

SCREEN PLUS generates error-free MFS source in minutes from scratch, other MFS source, or format library. Preview screens before creating MFS blocks. SCREEN PLUS... MFS source your user wants—the first time.



"Screen Plus generates MFS source in minutes."

—DON ODOM
BMC Product Support

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Want your five-year plan, sales by territory, capital budget, access to the IBM SNA world, or even your favorite public data bases? That's easy.

The ROLM Cypress Personal Communication Terminal combines a digital phone with a smart computer terminal. You can pre-store terminal profiles, so there is no changing settings like baud rates each time you call a different information source.

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Keyboard disappears.

access to the ROLM PhoneMail™ system, a clock, calculator and more. In one beautiful package.

Cypress is one more happy result of the most advanced, complete, proven, problem-free business communication system in the world: The ROLM CBX.

ROLM is the choice of the top FORTUNE companies, and -increasingly- the preferred solution to digital networking.

In fact, there are more than 12,000 ROLM CBXs worldwide and over 10,000 data devices communicating through ROLM systems. (That's more than all other PBX manufacturers combined.) And they're doing it now. Not tomorrow. Now.

So before you spend another day trying to talk to the people who talk to the computers, talk to us. Call (800) 538-8154. In Alaska, California or Hawaii, call (408) 986-1000, ext. 3025. Or write: ROLM, 4900 Old Ironsides Drive, M/S 626, Santa Clara, CA 95050.

ROLM. We're closing the gap between business information systems and the people who own them.

ROLM. NOW.

Bits & Pieces

Radio Shack Announces Addition to TRS-80 Line

FORT WORTH, Texas — Radio Shack has announced a top-of-the-line addition to its TRS-80 line of microcomputers.

Called the Model 16B, the 16-bit unit is available with single or dual floppy disk drives and comes with the firm's TRS-Xenix operating system. The Model 16B incorporates Zilog, Inc. Z80A and Motorola, Inc. 68000 microprocessors and features between 256K and 768K bytes of main memory, the vendor said.

The Model 16B features a built-in, user-accessible card cage that includes four plug-in expansion slots. This allows users to attach a hard disk drive, additional memory or high-resolution graphics, the vendor said.

The TRS-Xenix operating system reportedly increases office productivity by allowing up to three people to use the system without loss of performance, the vendor said.

The single-drive version of the Model 16B costs \$4,999. The two-disk version costs \$5,798. Radio Shack is located at 1800 One Tandy Center, Fort Worth, Texas, 76102.

SCMT-85 Computer Board Out, Based on Intel 8085A

HAYWARD, Calif. — Solarcom Technology, Inc. has announced an Intel Corp. 8085A-based microprocessor computer board said to be standard bus-compatible.

Designed to reduce product and system development costs, SCMT-85 reportedly combines advance I/O techniques for analog and digital applications, with a transistor-to-transistor logic-buffered bus system designed for memory expansion and I/O expansion as well as keyboard interfaces.

SCMT-85 incorporates an advanced address selection technique said to allow the user to select from a family of byte-wide read-only memory (ROM) and erasable programmable ROM (Eprom). It includes a 28-pin socket that is compatible with Jedec's 28-pin standard dual-in-line package pin-out, and it can be configured to accept from 2K- up to 8K-byte-wide ROM or Eprom.

SCMT-85 features 22 I/O ports; eight analog inputs; three state-buffered data, address and control buses; 14-bit counter/time; Eprom capacity on board; and 2,048-bit static MOS random-access memory.

SCMT-85 costs \$194 from Solarcom Technology, which can be reached through P.O. Box 4715, Hayward, Calif. 94544.

Multifunction Board Offered For IBM Personal Computer

ATLANTA — Easitech Corp. has unveiled a plug-in multifunction board said to combine the abilities of 11 separate products for the IBM Personal Computer and Personal Computer XT.

The Easiboard contains Easisort, which is said to allow sorting of complicated data in a simple manner; Ea-

sispool, a printer buffer/spooler that allows printing and computing simultaneously; three Easidisks, which are high-speed solid-state electronic disk emulators; Easitime and Easidate; Easiswap, which allows switching between two printers when both are connected to one IBM Personal Computer; a parallel printer connection; a communications port; and memory expansion of 64K bytes or 256K bytes of random-access memory.

Available only at authorized IBM Personal Computer dealers, the Easiboard is priced at \$325 with 11 functions. The Easimaster software package is included free. Two other models are priced at \$395 and \$595, with added memory capabilities. Ea-

sitech is located at Suite 22, 2215 Perimeter Park, Atlanta, Ga. 30341.

Desktop Engineering Unit Added to Megatek 1600 Series

SAN DIEGO — Megatek Corp. has introduced a monochrome desktop engineering terminal as a second offering in its 1600 series family of multifunction terminals, continuing to bring the functionality of its larger Whizzard graphics systems into the medium-priced, computer-aided design (CAD) environment.

The high-resolution Whizzard 1645 joins the Whizzard 1650 color terminal in Megatek's line of compact raster terminals. The 1645 offers

pixel resolution of 1,024 by 960 or 1,280 by 960, which can be selected from a set-up menu. The 1600 series reportedly provides two-dimensional interactive graphics concurrent with alphanumeric capability. Digital Equipment Corp. VT100/52 compatibility allows users to perform a full range of graphics design features, as well as software development, documentation and report generation.

The 1645 utilizes an 8 MHz Intel Corp. 8086 microprocessor as the graphics processor, an Intel 8085 microprocessor as a keyboard/peripheral processor and list processing techniques. It costs \$13,900. Megatek is located at 3985 Sorrento Valley Blvd., San Diego, Calif. 92121.

TIME-PROVEN PERFORMANCE



While new printers with impressive specifications are introduced on an almost daily basis, only time will tell the true quality of the product. Over the past 2 years our customers have continued to buy the DS180 printer, not only because of its impressive performance and competitive price, but also because of our outstanding track record for product reliability and customer support.

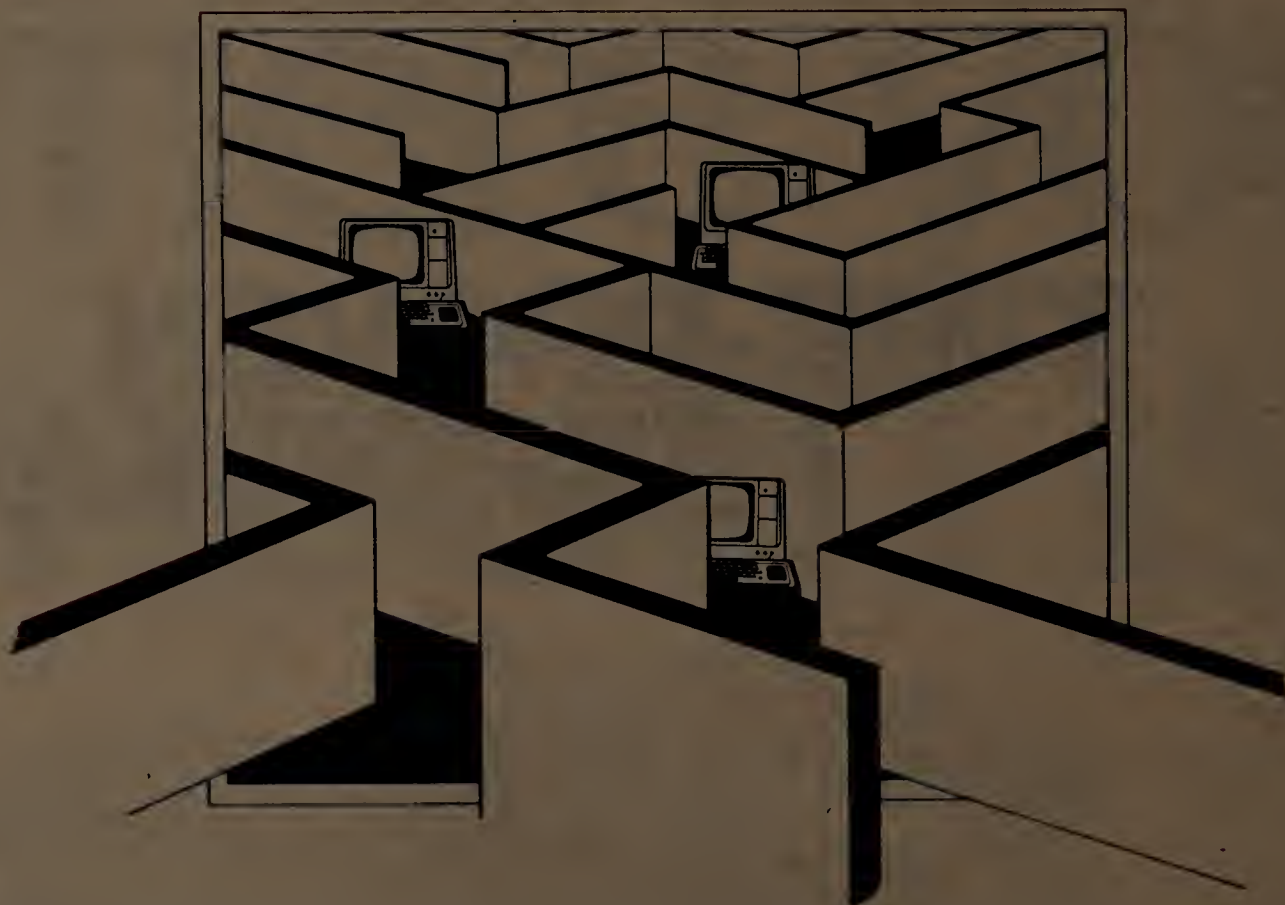
We have continually improved on the performance of the DS180 by incorporating such enhancements as dot addressable graphics, 6 user-selectable print sizes and a 2000 character buffer. These features coupled with 180 cps printing, parallel and serial interfaces, adjustable tractor feed and over 40 other programmable features, make the DS180 one of the most versatile matrix printers available today.

Before you select your next printer, why not take a look at a time-proven performer—the Datasouth DS180.

The DS180 printer is available nationwide through our network of sales/service distributors.

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IF YOU FIND THE TERMINAL MARKET A MAZE OF CONFUSING PRODUCTS



COMPUTERWORLD'S GOT A GUIDE FOR YOU THIS AUGUST!

The terminal market's not easy. From remote batch terminals to the 3270; from OCR equipment to editing CRT terminals — there's a dizzying array of products to choose from. And — as more intelligence is being built into terminals, giving end users a wider range of functions and greater flexibility in applications — choosing the right terminal for the job becomes even more difficult.

Today, there are more than 8,300,000 terminals installed, at a value of \$17.3 billion. And by 1987, International Data Corporation estimates that there will be nearly 22 million terminals installed, representing \$28.1 billion in dollar value.

Computerworld's August 29th Special Report on Data Communications Terminals will guide you through the latest developments in the terminal industry. You'll read tutorial essays, accounts of user experiences, reviews of current products and speculation about the future by experts in the industry. You'll get up-to-the minute information on:

- How to configure networks for multiple applications in your organization.
- How terminals are making computers more responsive to users' needs.
- New ways for getting the most out of dumb terminals.
- The best guidelines for evaluating terminal equipment.
- How data communications terminals will compete with personal computers.

If you have a "need to know" about data communications terminals — then August 29th is the issue of *Computerworld* you won't want to miss. And if you're a manufacturer or marketer of terminals or systems, don't forget August 12th — that's the last day you can reserve space in the Special Report. Call your *Computerworld* salesperson for more details or call Don Fagan, Vice President, Sales at 617-879-0700.



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Voice-Grade Line No Longer Viable

T-1 Multiplexer Offers Transmission Link

By John J. Hunter
Special to CW†

Data communications managers are faced with the difficult task of finding a cost-effective way to accommodate diverse requirements for remote transmission of data, voice and video. Because of its limited bandwidth, the conventional voice-grade telephone line — long the mainstay of most communications networks — no longer provides a viable solution.

Even with the most sophisticated modems, the highest data rate obtainable to date is 16K bit/sec. While this is adequate for lower data rates, it is unsuitable for higher data rates, digital voice, mainframe-to-mainframe data transfers and compressed video.

Typically, digital voice requires a bandwidth in the range of 32K to 64K bit/sec, while compressed video needs 450K bit/sec and up. Mainframe transfers require a minimum of 56K bit/sec for an IBM 3705 front-end processor.

All these data rates — except the 50M bit/sec — can be handled by a T-1 carrier, a facility that provides 1.544M bit/sec of usable bandwidth. However, some means must be used to interface these diverse inputs; a T-1 multiplexer provides this service. T-1 services have been offered for some time by independent carriers employing microwave and satellites.

The term T-1 carrier comes from the telephone system and relates to a digital line running at 1.544M bit/sec. This service is used when analog voice signals are digitalized for efficient transmission between central offices. The transmission link between offices has a 1.544M bit/sec bandwidth, which means that 24 channels operating at 64K bit/sec could be multiplexed to share one line.

Some larger users have opted for their

own independent facilities in the form of private microwave, infrared, digital radio, fiber optics, coaxial cable and twisted pair wiring. Now the telephone company is beginning to offer T-1 facilities to private users at very attractive rates.

To capitalize on this emerging market, a number of multiplexer manufacturers are offering T-1 devices that concentrate multiple diverse inputs to the T-1 carrier. The combination of T-1 availability from the phone company and reasonably priced multiplexers makes this extended wide-band service very attractive and brings it

within the reach of even smaller users.

A T-1 multiplexer, like any multiplexer, concentrates the data from many terminals into a format suitable for transmission over a single high-speed communications link. A T-1 multiplexer has a complete link speed of 1.544M bit/sec, although some vendors allow their products to operate at lower and higher speeds.

T-1 multiplexers typically use time division to allocate "time slots" on the communications link. All input channels to the multiplexer are sequentially scanned for a clocked time interval. Data from the attached device is placed into a time slot reserved for it in the message frame.

If the sampled device has no data to send, its empty slot remains part of the message frame. After all channels have been sampled, the message frame is transmitted to the host end where another multiplexer demultiplexes the data.

With time-division multiplexers, the aggregate input speed cannot exceed the speed of the communications link. A statistical multiplexer, by contrast, allows the "overbooking" of the high-speed communications link because buffering is employed. Time-division multiplexers offer very limited input buffering, typically only a few bits per channel.

(Continued on Page 82)

IBM Emulation Out For DEC's VT180, Rainbow 100

MARYLAND HEIGHTS, Mo. — Polygon Associates, Inc. has announced software emulation of the IBM 2780 data transmission terminal and IBM 3780 communications terminal for Digital Equipment Corp.'s Rainbow 100 and VT180 systems.

Personal computers running the software can exchange Ascii (with optional Ebcidic translation) and binary files with computers supporting attachment of 2780 or 3780 RJE workstations, according to the vendor.

Polygon Associates' software reportedly provides supported personal computers with all standard features and most optional features of 2780 and 3780 RJE workstations.

Multiple files may be queued for transmission and reception with characteristics set by file or by user-defined table of file extensions.

The software sells for \$500, the vendor said. More information is available from Polygon Associates, located at 9 American Industrial Drive, Maryland Heights, Mo. 63043.

Softtron Unveils ICM Version For System/34

AUSTIN, Texas — Softtron, Inc. has announced Version 1.0 of its Interactive Communications Monitor (ICM) software package for IBM System/34 users.

The package reportedly allows up to eight workstations on the System/34 to exchange information.

Each line of transmission by any session participant instantly scrolls up the screens of all terminals in the session and is identified by the sending workstation's identification code. An optional logging facility is included in the ICM to allow conversations to be recorded on disk for later printing of transcripts by any session participant, according to the vendor.

Priced at \$375, the ICM is available from Softtron at Box 27003, Austin, Texas 78755.

Scitec Software Enhancement Added to CPX, MUX Stat Muxes

MIDDLETOWN, R.I. — A software enhancement to its CPX and MUX statistical data multiplexers, that are used to support Wang Laboratories, Inc. devices, has been announced by Scitec Corp.

The enhancement provides flow con-

Linemaster Boasts Dial-Up Access

NEW BRUNSWICK, N.J. — Microframe, Inc. has introduced a microprocessor-controlled device that reportedly allows IBM 3270 users of IBM's protocol Binary Synchronous Communications to have dial-up access normally available only with Systems Network Architecture/Synchronous Data Link Control.

Installed with RS-232 connectors between a mainframe and a modem, Linemaster reportedly administers line usage and assumes terminal controller responsibility when no user is dialed in.

Linemaster also acts as a debugging tool by keeping a remote line active while equipment is being serviced, the vendor said.

Linemaster is priced at \$639, according to a spokesman for the vendor. More information is available from Microframe, 205 Livingston Ave., New Brunswick, N.J. 08901.

trol to the Wang devices being supported simultaneously by the CPX or MUX statistical data multiplexers and supports Wang's Xon/Xoff character format for CRTs and printers.

The multiplexers handle up to 32 remote devices over a single telephone line, feature English language prompts and have no intermix restrictions on channel speeds or formats, according to Scitec.

Prices for the CPX or MUX statistical data multiplexers start at \$1,850. Further information is available from Gerald A. Olson, National Market Support Manager, Scitec, 811 Aquidneck Ave., Middletown, R.I. 02840.

Terminal Reads Seven Bar Codes

ELBRIDGE, N.Y. — A data terminal that reads seven bar codes is now available from Skan-A-Matic Corp.

The D5 Series Reader/Terminal reads bar codes without changing switch settings or software, according to Skan-A-Matic. Bar code data may be entered by a code pen, by external fixed-beam or moving-beam scanners or by an integral card slot scanner.

It features an alphanumeric keyboard, a two-line, 80-char. LCD and two-way communications via RS-232, RS-442 or 20mA current-loop interfaces.

The D5 data terminal can add bar code reading to existing data collection systems or replace CRT terminals for inventory management, production process tracking, employee productivity management and other shop floor situations, according to the vendor.

The price of the unit is \$1,255 for just the base, or \$1,705 for the base with slot reader, according to a spokesman for the vendor.

Additional information is available from Skan-A-Matic, through P.O. Box S, Elbridge, N.Y. 13060.

Allows Synchronous Communications

Package Out for PC Express Users

PALO ALTO, Calif. — Intelligent Technologies International Corp. has announced the PC-to-PC 4800 Baud, a software package which permits users of the firm's PC Express communications package to use their IBM Personal Computers for synchronous communications with other IBM Personal

Computers over 4,800 bit/sec voice-grade lines.

The package allows users to transmit rapidly and economically and receive files and electronic mail at a rate of more than two typewritten pages per second. The package features an automatic error recovery feature which ensures that any data transmission error will be detected and corrected, the

vendor said.

The PC-to-PC package is required for both transmitting and receiving IBM Personal Computers. The firm's PC Express package is also required, the vendor said.

The PC-to-PC 4800 Baud package costs \$350 from Intelligent Technologies International, located at 151 University Ave., Palo Alto, Calif. 94301.

ARQ Error Corrector, Speed Enhancer Introduced

FRENCHS FOREST, Australia — A data communications error corrector and speed enhancer has been introduced by Case Communication Systems Ltd.

The ARQ reportedly combines the functions of asynchronous - to - synchronous conversion, speed translation and error corrections and is designed for use with video display units, printers,

graphics terminals, microcomputers and intercomputer communications links.

Single-unit price for the ARQ is expected to be about \$350, according to a spokesman for the vendor.

Further information is available from Case Communication Systems, located at 1-3 Rodborough Road, Frenchs Forest, NSW 2086, Australia.

T-1 Muxes

Seen Linking Transmission

(Continued from Page 81)

With a T-1 multiplexer, users can assign individual terminals to a channel configured to handle its speed and protocol. Many T-1 multiplexers will handle asynchronous and synchronous data, but they differ in input speeds, number of channels and types of data used.

The terminal applications are pretty straightforward, consisting of those employing limited-distance modems, long-haul modems and those connected via the direct-distance dial network.

With statistical multiplexing, each connected terminal operates at a different speed, and the aggregate input far exceeds the 4,800 bit/sec aggregate output.

An Attractive Facility

In summary, the availability of a T-1 carrier facility at the low costs quoted by the telephone company makes that transmission facility quite attractive even for smaller users. When teamed with a T-1 multiplexer, users have a vehicle which can handle the variety of inputs.

However, not all T-1 multiplexers are created equal. Some do not support asynchronous devices, thus requiring users to employ multiplexers as interfaces to the T-1 multiplexer. Others do not fit the time slot to the transmission speeds of the device. Requiring additional multiplexers to support asynchronous data increases overall system costs, while compromising size slots waste bandwidth.

There are a number of good T-1 multiplexers available; evaluate them with present and future needs in mind.

Hunter is a senior editor/analyst at Data Decisions, Inc. His article is based on material in Data Decisions' Communications Systems, a three-volume monthly updated information service available by subscription. A review copy is available for \$660 from the company at 20 Brace Road, Cherry Hill, N.J. 08034.

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example, we put the power "on/off" switch and contrast control knob in front where they're easy to reach.

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Controllers Establish IEEE-488 Bus

SAN JOSE, Calif. — ICS Electronics Corp. has introduced a bus controller that reportedly makes an RS-232 or RS-422 serial data port appear and function like an IEEE-488 bus controller.

Connected into the serial link between a central computer and a terminal, the 4835 bus controllers reportedly establish an IEEE-488 bus wherever it is situated along the serial link.

The user connects the

4835 into the serial link near the user's terminal and writes 488-type programs that run on that terminal, which is connected to the 4835 via the IEEE-488 bus. The 4835 reportedly needs no software other than the 488-type programs, which may be written in any language used by the central computer.

The 4835 bus controller costs \$1,450.

More information is avail-

able from ICS Electronics, 1620 Zanker Road, San Jose, Calif. 95112.

I/O Module Announced

BROOKFIELD, Conn. — Connecticut Microcomputer, Inc. has announced a 64 digital line I/O module that is said to be a self-contained IEEE-488 bus-compatible device.

The Busster C64 works with any computer with an

ALBANY, N.Y. — General Electric Co.'s Instrumentation and Computer Service Department has introduced a

IEEE-488 interface. It reportedly accepts data from any host computer through its IEEE port to read or write 64 digital TTL-level lines.

The module sells for \$495 from Connecticut Microcomputer at 36 Del Mar Drive, Brookfield, Conn. 06804.

stand-alone workstation that features a terminal, modem and printer.

The No-Worry workstation includes an IBM 3101/20 CRT terminal, Racal-Vadic 212PA modem and an optional Computer Transceiver Systems, Inc. Execuport letter-quality printer.

Until Sept. 9, 1983, the price for the terminal and modem is \$99 per month for a one-year lease and \$139 per month with the printer.

General Electric Co. is located at Suite 500, 80 Wolf Road, Albany, N.Y. 12205.

Modem Fits Apple II, Franklin Ace

BOSTON — The International Modem Exchange Corp. (Timecor) has introduced a modem for use with the Apple Computer, Inc. Apple II, Franklin Ace 1000 from Franklin Computer Corp. and Basis 108 computer lines.

The Operator, a self-contained modem, comes complete with documentation and start-up software programs on disk, according to Timecor, and is compatible with most communications packages.

It features a 110/300 bit/sec rate, half and full duplex mode, autoanswer and disconnect and is compatible with Rotary and Touch-Tone, the vendor said.

The price of the modem is \$159.95. Further information is available from Timecor, Four Longfellow Place, P.O. Box 8928, Boston, Mass. 02114.

Program Out For Micro

IRVINE, Calif. — Acquis Data, Inc. (ADI) has announced the availability of a communications program for the Linear Systems, Inc. Kaypro II microcomputer with an automatic logon to such on-line data base services as Dow Jones, The Source and Compuserve, Inc.

RTD includes configuration menus for up to five individual user-defined services. It also features dispatching and capturing files, a 16K-byte buffer space for temporary data storage and one-time installation for various data base services.

RTD operates at 300 or 1,200 bit/sec and is compatible with most non-autodial modems, according to the vendor.

Priced at \$85, RTD is available from Acquis Data at 17192 Gillette, Irvine, Calif. 92714.

entry almost as natural as talking.

Because the only thing that should be difficult is making an error.

On the ADM 11, for example, you'll find the separate

Block mode terminals simply can't match this high throughput.

In addition there are four programmable function keys (shiftable to eight) with two levels of setup mode to reduce errors while still giving the operator maximum flexibility.

On the other hand, for a High Touch terminal that's more intelligent and has more functions and features, choose the ADM 24E. It features a moveable 24-line window you can use to look at 48 (or optionally, 96) lines of memory.

There are eight non-embedded attributes with embedded mode for existing applications, and 16 programmable non-volatile function keys (shiftable to 32) with legends on the status line (25th line). It runs in either conversational or block mode.

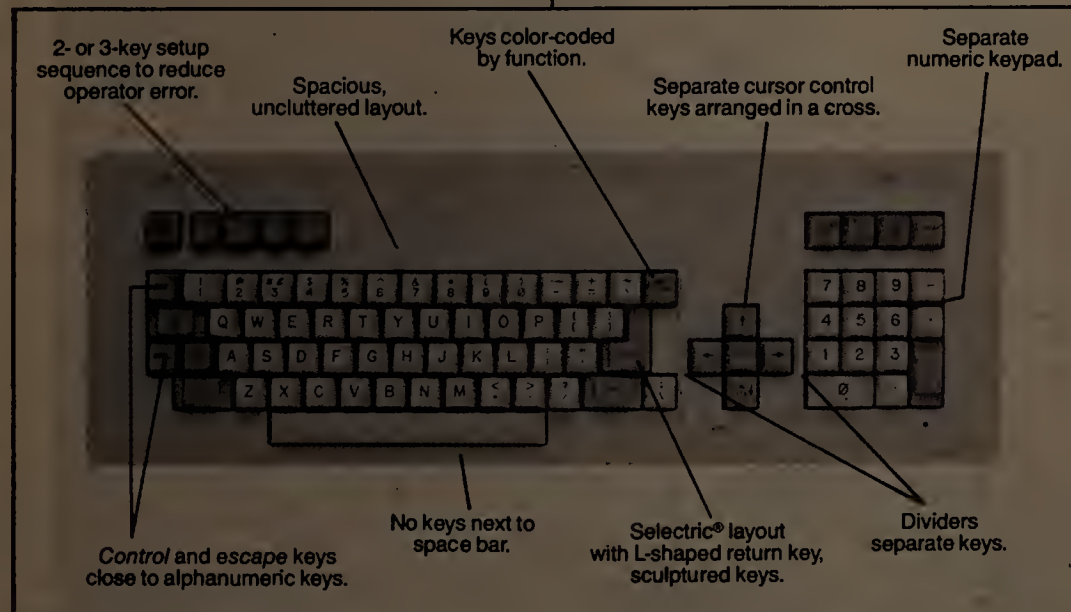
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Microprocessor-Based Hand-Held Communications Tester Released

LINCOLN, R.I. — International Data Sciences, Inc. has announced a new hand-held data communications tester.

The microprocessor-based IDS Model 67/60 combines a full-function bit error rate test, polling test, echo test and user system evaluator message generator with an RS-232C, V.24 breakout and monitor panel, the company claimed. An audio alarm alerts the user in case of incorrect or invalid switch setting.

Error counts, transitions and hexadecimal readouts of user-assembled messages are displayed on a four-digit LCD. Asynchronous and synchronous tests can be performed at

data rates from 75 bit/sec to 19.2K bit/sec. A clock is provided for timing at all common data rates.

The unit is priced at \$995.

Also available from the company is the Model 1320 test, which is part of the company's Range Rider line of data communications test equipment.

The 1320 is portable and self-contained and is designed to analyze the error rate of any digital transmission network, a spokesman said. The unit can be used to test synchronous, asynchronous or start/stop character-oriented systems such as time division multiplexers. Bit, character and block error rates are determined

by transmitting pseudorandom test patterns over the communications channel, a spokesman noted.

The unit is priced at \$4,145. Addi-

tional information can be obtained from the Marketing Department of International Data Sciences, 7 Wellington Road, Lincoln, R.I. 02865.

Harris Unfurls Data Switch For Two-Pair PBX Lines

NOVATO, Calif. — Harris Corp. has announced a direct digital data switching feature between private branch exchange (PBX) lines at 9,600 bit/sec using a two-pair interface. The feature is available on Harris' D1200 family of PBXs. The units are

produced through the Harris Digital Telephone Systems Division.

The feature enhances the PBX utility in the office by allowing data transmission without modems. Direct data transmission allows users to enter the desired extension number through a keyboard. The data is transmitted from port to port in a digital format. This saves the cost of modems and allows for automatic selection of a transmission rate over a 110 to 9,600 bit/sec range.

The data transmission capability makes use of a line driver box located near each terminal. This extends the transmission distance up to 4,000 feet. The interface between the driver and PBX requires a two-pair line. Without special wiring, the vendor said.

The feature will be available in September and will cost \$400 per line, the vendor said from its Digital Telephone Systems Division, Novato, Calif. 94948.

Data Recorder Offers Portability

ALEXANDRIA, Va. — Atlantic Research Corp. has announced the Interview 20R, a stand-alone portable data recorder. The device is part of the firm's line of data communication test equipment.

Designed to be used with any protocol analyzer, the Interview 20R features a tape format compatible with the firm's Interview 3500/4600 series data analyzers. The unit records a bit image of the communications line. This allows for protocol independent data recording at up to 19.2K bit/sec using an integral 600K-byte tape drive. With the addition of a 524K-byte capture random-access memory, the device can operate at up to 72K bit/sec, the vendor said.

The domestic price for the Interview 20R is \$4,750. Atlantic Research Corp. is located at 5390 Cherokee Ave., Alexandria, Va. 22314.

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AZPC2 Released as 3278 Emulator

OTTAWA — Simware, Inc. has introduced an IBM 3278 emulator that is said to allow the IBM Personal Computer to become an intelligent Ascii full-screen workstation with attached printer support and a file transfer capability.

AZPC2 reportedly allows the user to send and receive files using the IBM Personal Computer's 10 function keys. Printer support is provided through AZPC2's file transfer capability, with two host-resident utility programs providing the necessary print-file preparation.

File transfer can reportedly be performed either in line-by-line or full-screen mode. AZPC2's accompanying software protocol converter for IBM MVS operating systems,

called Sim3278/Vtam, reportedly transforms microcomputers and Ascii video display terminals into IBM 3278 terminals.

The software sells for a one-time

license fee of \$12,000, and AZPC2 is priced at \$750/mainframe. More information is available from Simware at 969 Bronson Ave., Ottawa, Ont., Canada K1S 4G8.

VME Bus-Compatible Board Bows

TEMPE, Ariz. — An eight-color video display board said to be both VME bus-compatible and intelligent has been introduced by Data-Sud Systems/U.S., Inc. The board is said to provide 512-by-512 resolution.

The DSSE512Chroma8-1 is built around two processors and, according to Data-Sud, provides the capabilities for vector and point plotting; Ascii alphanumeric character display; circle, disk and ring figure gen-

eration; light pen; image memory read back; and read-modify-write on video random-access memory (RAM.) Communication is possible via the VME bus interfacing with the dual-ported RAM of the Motorola, Inc. MC68121 or via an RS-232 line. The display board provides 192K bytes of image memory.

Prices start at \$2,500, Data-Sud said from Suite J, 2219 S. 48th St., Tempe, Ariz. 85282.

Pathway Tools Allow Emulation Of IBM Systems

WELLESLEY, Mass. — Pathway Design, Inc. has introduced software and hardware said to allow the IBM Personal Computer and IBM-compatible microcomputers to emulate IBM 3270 information display system devices and IBM 2780/3780 and 3770 RJE workstations.

The emulator reportedly creates compatibility between the microcomputers and IBM host mainframe computers such as the System/370, 30 series and 4300 series, the 8100 information system and the 3790 communications system.

Access to the host is provided through a communications adapter, consisting of a circuit card attached to a microcomputer expansion slot, and an adapter cable connecting the card to the user's external modem, according to a spokesman for the vendor. Both are used in conjunction with the vendor's software, the spokesman said.

Microcomputers with which the emulator can be used include Compaq Computer Corp.'s Compaq; Eagle Computers, Inc.'s Eagle; and Digital Equipment Corp.'s Rainbow 100, which can be tied into IBM's System Network Architecture or IBM's Binary Synchronous Communications, according to a vendor spokesman.

Available in September, the adapter and adapter cable are priced at \$295 and \$40, respectively. The license for the software costs \$595. More information is available from Pathway Design at 177 Worcester St., Wellesley, Mass. 02181.

Teleasync Lets Micros Exchange Data

SUNNYVALE, Calif. — Televideo Systems, Inc. has introduced a software package that reportedly allows the vendor's personal computer systems to exchange data with Televideo and other mini and microcomputer systems and provides the systems with the ability to act as terminals for access to on-line public information services.

Using standard dial-up telephone lines with asynchronous modems, Teleasync features file transfer capability that moves electronic mail, word processing, spreadsheets and data bases between two Televideo personal computer systems.

Teleasync is licensed for \$150. More information is available from Televideo Systems, 1170 Morse Ave., Sunnyvale, Calif. 94086.

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ment will be giving you a standing ovation. Below is a listing of the courses and dates available at the new Los Angeles Performance Center. For detailed course descriptions or complete enrollment information. Call TOLL FREE (800)526-0272.

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CICS/VS Logic and Debugging
August 22-25, October 31-November 3, December 12-15

Performance and Tuning
September 12-13

Recovery/Restart
September 14-15

CICS/VS Internals
August 15-19, November 14-18

VSAM: Its Structure and How to Use It
October 24-27, December 19-22

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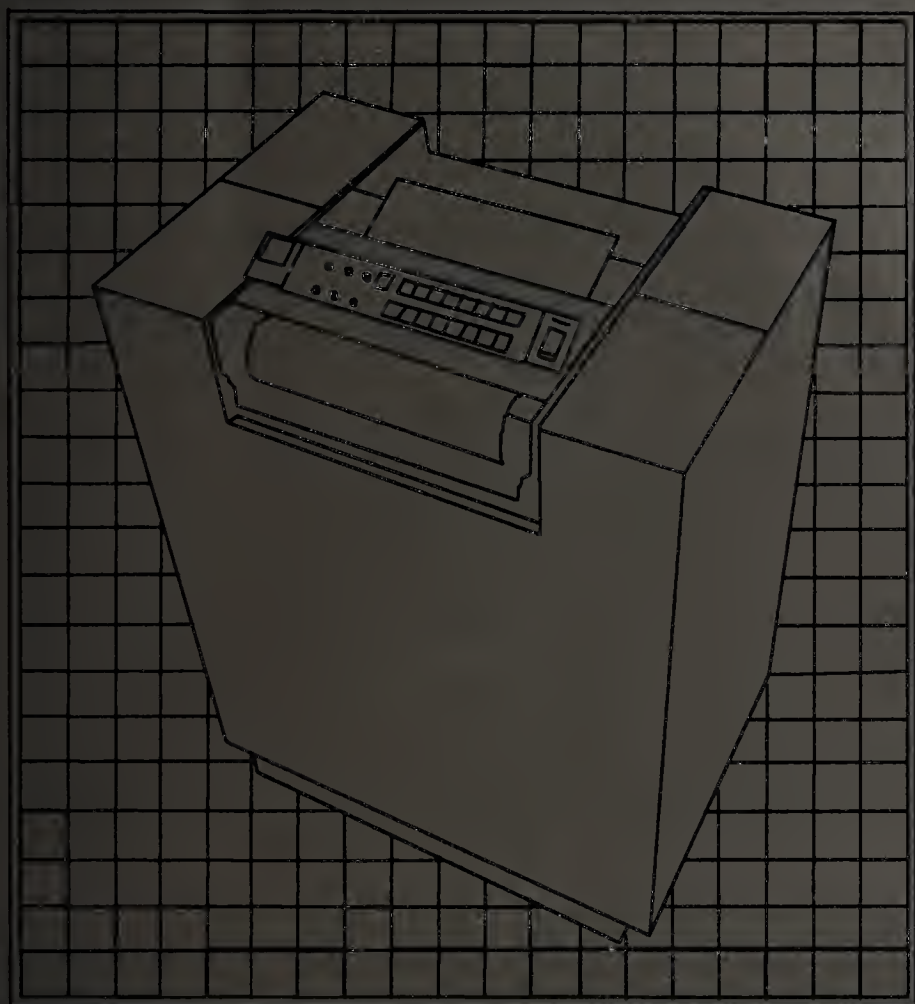
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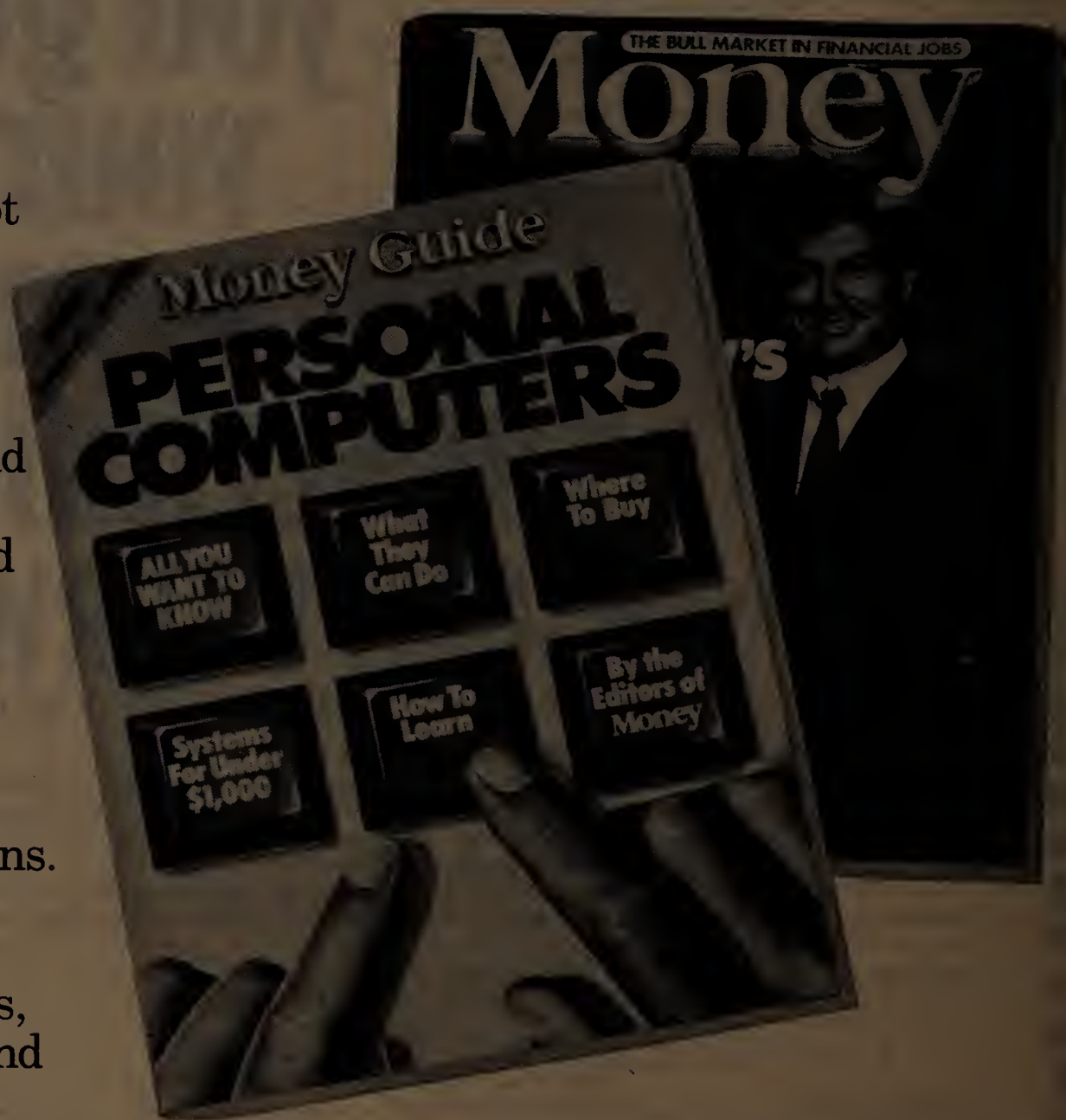
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Office Designers Lack OA Knowledge: Study

By Katherine Hafner
CW Staff

HOLYOKE, Mass. — The complete automation of an office, from ergonomically correct seating to the proper ambient lighting, is a matter of solid cooperation from the people who make the lights to the interior designers.

But what if the business designers are not educated enough about the technology that is moving into offices? And worse, what if they have no immediate resources for educating themselves?

A recent survey conducted by Dennison National Co. here, the makers of computer support furniture, found that of the 500 members of the nationwide Institute of Business Designers (IBD) questioned, only 51% said they have an understanding of electronic office equipment and 46% said they do not.

That so many claimed they did not have a good understanding of office automation equipment suggests either a lack of interest in furthering their expertise or inadequate educational opportunities, the survey said.

'Even those designers who understand office automation equipment are unable to develop efficient work areas because businesses are reluctant to invest in automated office plans.'

"If [the latter] is indeed the case," the study reported, "it is recommended that the educational aspect of this profession be dramatically improved."

A total of 63% of the designers agreed that more education and training are needed in order for them to understand the effects of technology on office design.

According to the survey, even those designers who understand office automation equipment are unable to develop efficient work areas because businesses are reluctant to invest in automated office plans, which include network architecture, computer support furniture systems and personnel reorganization.

"The major reason for this reluctance is the lack of accepted methods of measuring office productivity," the survey continued. As a result, businesses are installing only pieces of the total office that, by themselves, do not increase office efficiency.

But there are those designers who take exception to the survey's findings, calling it "completely off base."

"Designers are very much aware of the problems involved in designing business interiors today," commented Eugene Daniels, president of IBD. "More and more seminars are being given on the subject, and we're constantly seeking additional information about it."

"The designer's need is not to become proficient in operating a word processor or computer, but to know what is required of the environment to enable the user to function safely and at peak productivity," said another IBD spokesman. "I find that professional designers are extremely sophisticated and aware of the needs of the users for ergonomic workstations."

OFFICE AUTOMATION

PBX Directory To Serve Large Companies

BEDFORD, Mass. — A computer-based private branch exchange (PBX) directory system for companies with 2,000 to 100,000 employees has been introduced by Deweese Associates, Inc.

The Telphi System responds in less than two seconds per average call, according to Deweese, reducing call handling time up to 50% over manual listings. Employing a 16-bit microprocessor with user or system-supplied CRT terminals and printer, the Telphi provides letter-quality printouts or magnetic tapes for up-to-date directory printing, according to the company.

The system serves up to 32 terminals, custom-formats and displays up to 10 directory files with up to 30 information fields and special note sheets. It is backed by streaming tape to prevent data loss and is protected by terminal-enable and user password entry. It can be upgraded for message storage, according to the vendor.

The system is priced from \$40,000. More information is available from Deweese Associates, 7 DeAngelo Drive, Bedford, Mass. 01730.



Deweese Associates Telphi System



Lanier Business Products OM-15 local-area network processor

Lanier Announces Local-Area Net With Workstations, WP Software

ATLANTA — Lanier Business Products, Inc. has introduced a local-area network processor for office applications, along with two workstations and word processing software to run on the network.

The OM-15 network processor supports mass storage and batch processing resources for all stations on the network and will be available in 8-, 16- and 32-bit architectures, a Lanier spokesman said.

The minimum processor configuration is 256K bytes of random-access memory (RAM) expandable to 1.7M bytes of RAM. The OM-15 uses the Lanier Lexs operating system and can connect up to 4,000 stations using multiple processors.

A device on the network can function independently or exchange information with other stations on the network for electronic mail and messages. The OM series serves as a network manager, a data base service, background processing and communications processing. The network information channel is coaxial cable that runs at 1.25M bit/sec, a spokesman said.

As a token-passing baseband network, stations are connected sequentially so that

if a single station shuts down or fails, it does not affect the other stations, a vendor spokesman said. The network processor is available for between \$10,400 and \$18,900.

Also introduced was the EZ-2 Work Processor — a fully configured workstation designed to work alone, in tandem or as part of the OM-15 network. A typical configuration would be an executive and an administrative person working on common documents, according to a vendor spokesman. As many as 20 EZ-2s can be supported by one OM-15 network processor. The EZ-2 is available for \$4,995.

The LCGWS-100 is a color 15-in. CRT terminal that runs software from Lanier's EZ-1 family of word processors as well as other software. The terminal is available for \$9,995.

One-Step is a word processing software package also introduced by Lanier, designed to run on the EZ-2 and on the OM-15 network. It will be provided at no charge to users with EZ-1 workstations and will cost \$900 for new users. More information is available from Lanier, 1700 Chantilly Drive N.E., Atlanta, Ga. 30324.

Victor Unwraps Three Lines Of WP, Financial Systems

SOUTHBORO, Mass. — Victor Computer Corp. has announced three lines of microcomputers.

The Eagle II, III and IV are word processing and financial planning business systems designed for first-time users. The units are based on a Zilog, Inc. Z80 microprocessor and include a keyboard with full numeric and alphanumeric pads, a 12-in. video display, Eaglewriter word processing software and an Eaglecalc spreadsheet package.

The systems cost from \$1,595 for an entry-level system to \$3,999 for a top-of-the-line configuration, the vendor said.

The Eagle P.C. is fully compatible

with IBM's Personal Computer, a vendor spokesman said. Based on the Intel Corp. 8088 16-bit microprocessor, the unit supports Microsoft, Inc.'s MS-DOS and Digital Research, Inc.'s CP/M-86 operating systems.

The processors can accommodate one or two floppy disk drives or a hard-media disk. The units cost from \$1,995 to \$4,495, the vendor said.

The top-of-the-line Eagle 1600 series is based on an Intel 16-bit 8086 microprocessor. The systems were designed to support the same software as the Eagle P.C. The 1600 series is priced from \$4,495 to \$8,995, Victor Computer said from 304 Turnpike Road, Southboro, Mass. 01772.

DEC Tool Corrects Spelling

SAN FRANCISCO — Digital Equipment Corp. has introduced a spelling correction package that reportedly recognizes and corrects multiple spelling errors in the same word.

Running as part of DEC's All-In-One office system running on the vendor's VAX-11 superminicomputers, DECspell reportedly provides a built-in dictionary containing more than 70,000 English words. The system is said to find and correct misspellings and typographical errors in letters, documents and literature.

DEC has also introduced an electronic mailroom for office employees to transmit messages to the U.S. Postal Service's Electronic Computer-Originated Mail (E-Com) network for conversion to printed mail.

For use on DEC's All-In-One office system, mail can be created, edited, printed, stored and mailed from a workstation terminal connected to a DEC VAX-11/730 superminicomputer. Messages are transmitted via telephone lines to an E-Com-serving post office.

DECspell costs \$4,000, and the mailroom charge is 26 cents per letter. More information is available from DEC, Parker St., Maynard, Mass. 01754.

Anadex Offers Price Reduction On Printer

CHATSWORTH, Calif. — Anadex, Inc. has reduced the price of its WP-6000 letter-quality printer from \$3,250 to \$2,700.

The WP-6000 reportedly provides letter-, correspondence-, draft- and DP-quality modes, as well as graphics. In the letter-quality mode, the printer operates at 125 char./sec, and in the data processing mode, speed is 230 char./sec.

Additional information can be obtained from Anadex, located at 9825 De Soto Ave., Chatsworth, Calif. 91311.

Paratext Users Get Spelling Aid

GLOUCESTER, Mass. — The author of Paratext has announced a spelling checking system of Paratext documents.

The system reportedly permits Paratext users to scan words in documents and print lines with words that were not found. The system uses two dictionaries: one containing 1,024 frequently used words and another on disk, which can store words needed by the users, according to the vendor.

The spelling checking system license fee is \$150 for the IBM System/34 and \$200 for the System/38. More information is available from Two Ocean View Drive, Gloucester, Mass. 01930.

Service Targets XNS Protocols

CUPERTINO, Calif. — A service for certifying the compatibility of vendor implementations of Xerox Corp.'s Network Systems (XNS) higher level protocols will be offered by Bridge Communications, Inc. beginning in December.

Developed jointly by Bridge and Xerox, the certification procedure is designed to increase the compatibility of XNS protocol implementations among the various Ethernet systems on the market, a Bridge spokesman said.

Fees for the Bridge certification service will fall within \$5,000 and \$10,000. More information is available from the XNS Compatibility Testing Office at Bridge Communications, 10440 Bubb Road, Cupertino, Calif. 95014.

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Analysts Betting on New Strategy

Prime Execs' Departure Reflects Changes

By Patricia Keefe
CW Staff

The era of its meteoric growth under founder Kenneth Fisher behind it, a mature Prime Computer, Inc. is taking a more conservative path, placing heavier emphasis on long-term planning.

Although the change has left a sour taste internally, some analysts are betting the new strategy will sweeten the mini-computer maker's future earnings, provided Prime does not overlook present market opportunities.

However, the departure two weeks ago of six top and middle-level executives to Fisher's latest venture, Encore Computer Corp., coupled with Prime's inability to forecast correctly its earnings over the last two quarters, has damaged its reputation in the eyes of Wall Street.

And Wall Street "deserves to be worried," according to Ken Bosomworth, president of International Resource Development, Inc. As of last Monday, the value of Prime's stock had dropped 15% to \$17 per share from the previous Friday, when the resignations were announced. Also, Prime said it expects a 45% drop in second-quarter earnings.

Leaving Prime for Encore are regional Vice-Presidents Eugene F. Ringstad, George H. Dudley and John D. Ludden and three other mid-level sales personnel.

Prime's announcement of the six resignations and its suspicions of more pending, forced Fisher and Data General Corp. founder Henry Burkhardt to call a hastily assembled press conference in New York last Thursday to unveil their Natick, Mass.-based venture, an Encore spokesman said. Encore denied Fisher had traded a large portion of his share of Prime stock for financing or that it was conducting a "raid" on Prime talent, already depleted by resignations connected to management change. A Prime spokeswoman conceded there has been virtually 100% turnover at the executive level over the past few years.

An integral part of Prime President Joe Henson's IBM-oriented strategy is planning bolstered by heavy investment — reportedly exceeding 10% of revenues — in research and development. The key word here, according to several industry analysts, is "long-term." With its product cy-

(Continued on Page 96)



CW File Photo

Kenneth Fisher

Survey Shows IBM Taking Bigger Bite of Low-End Mart

By Bill Laberis
CW Staff

NEW YORK — For the first time in over

a decade, IBM has managed to penetrate deeply the low-end systems market, giving itself a firm base upon which the company can leverage purchases of bigger ticket items.

Meanwhile, some "traditional" computer vendors, such as NCR Corp. and Burroughs Corp., have failed to cultivate multiple distribution channels to market low-end product offerings outside their present user base. Vendors who have failed to do so will now find it difficult to establish an effective network of third-party distribution because these channels are already crowded.

These are some of the conclusions drawn from a comprehensive survey of nearly 14,000 users that was presented here recently at the Technology Trends seminar hosted by Shearson American Express.

Study results, unveiled to over 100 security analysts at the seminar, indicated that IBM was "the big winner" in the microcomputer and minicomputer arena in 1982, establishing what will soon be an

(Continued on Page 96)

GE, Comsat Work Out CGIS Deal

WASHINGTON, D.C. — General Electric Co. and Communications Satellite Corp. (Comsat) have announced an agreement whereby GE will purchase the digital electronics portion of Comsat's computer-aided design (CAD) engineering software subsidiary, CGIS.

The deal, worth about \$14 million in cash, will involve Comsat's retaining the microwave division of CGIS, while the CAD division purchased by GE will continue to operate under its present management. Operations being acquired include simulations software for integrated circuits and printed-circuit boards that run on mainframe computers as well as designer workstations.

Commenting on the agreed pur-

chase, Donald K. Grierson, senior vice-president of GE's Industrial Electronics Business Group, said the acquisition "will strengthen GE's position in the CAD and design market. Calma Co., acquired by GE in 1981, is a leading participant in this field.

Speculation of just what high-technology acquisitions GE will make has been running rampant for several months. The cash-rich company is sitting atop well over \$4 billion in cash and securities, and William Welch, company chief executive officer, has publicly stated his intention to steer the diversified giant into leading-edge industries and away from GE's smoke-stack heritage.

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Software Writer for System/38

Venture Gears Up for Next Step, Next Product

By Lois Paul
CW Staff

NORTH ATTLEBORO, Mass. — About six months after introducing its first packaged software offerings for the IBM System/38, RTC Systems, Inc. has its marketing force in place, documentation written and is poised for expansion and new product de-

velopment.

RTC Systems is one of only a handful of firms that are developing software for the IBM System/38. The firm's focus on this system stems from the background of its president, John Robinson.

While working as a DP manager for several manufacturing firms,

Robinson had been exposed to IBM's System/3, System/34 and 360/20 equipment. When he began to work on some of the beta test sites for the System/38 three years ago, he realized that the capabilities of the data base in an RPG environment were exactly what general manufacturing and distribution organizations needed. He also recognized the potential market for software for the System/38 because IBM was investing so much money in developing its new architecture.

"We knew it was long-term," Robinson said in a recent interview. "I have yet to see them make a huge long-term mistake."

Most of the approximately 50 clients of RTC products are in the manufacturing or distribution industries. "They want to be able to control their levels of spending and keep track of their business forecasting in an on-line environment which they didn't have before," Robinson explained. The System/38 also appeals to these companies because it requires low overhead in terms of technical staff.

Early Client

Robinson recalled that an early RTC client had both a System/38 and an IBM 4300. A group of five RTC programmers "went in there and in six months put up all of their financial applications, their manufactur-



John Robinson

ing applications, their order processing invoicing in RPG."

He recalled that the company's in-house staff of 12 for the 4300 was still working on a payroll system for that machine during the same six-month period. "The productivity is so much greater on the System/38 in a similar environment where it just doesn't make a hell of a lot of sense for a company that doesn't need a very high-level machine. That is where our market is going to be."

Robinson attributes RTC's relative lack of competition in the System/38 software area in part to the fact that larger applications software houses are converting Cobol-based main-frame-oriented software to run on

(Continued on Page 98)

Personnel Search Group Fills Dual Role for RTC

NORTH ATTLEBORO, Mass. — When RTC Systems, Inc. needs to hire more programmers, its management does not have to go far. This company is in the enviable position of having its own internal recruitment firm.

The RTC Search Group, headed by Jim Phillips, was established in February to scour the country for RPG-III and IBM System/38 talent for both in-house use and for external clients. "We probably have the largest pool of RPG-III talent certainly in the Northeast, maybe even nationally," Phillips said.

In addition to placement services, the RTC Search Group provides testing services.

Since the RTC Search Group was formed, it has been responsible for

recruiting 90% of new hires at RTC. In addition, Phillips' group finds that it often is scouting for potential clients for RTC products.

"It almost serves as an extension of the marketing department in a lot of cases. Also, we talk to them maybe on a more regular basis, so if they are not interested in something right now, as their interest is growing, we can sort of feel their pulse and find out when they might be ready to buy," he said.

Phillips anticipates that as RTC's educational facility grows, his group will be able to use it to train people in-house. He maintains contact with local schools and already has hired two RPG students from Blue Hills Regional School in Taunton, Mass., for RTC Systems.

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Study Finds IBM Penetrating Low-End Mart

(Continued from Page 93)

undeniably dominant position in the personal computer market while making great strides in the industrial automation area with its minicomputer line.

According to Donald Brown, the Shearson vice-president who presented the study results, IBM has reestablished its preeminence in the low end for the first time since the early '70s, when the company chose not to upgrade its 1800 series, its standard process control system of the '60s.

Failure to upgrade back then "left the established customer base highly dissatisfied, which came back to haunt IBM when it tried to reenter the business in the mid-'70s with the

Series 1," the study noted.

With the highly successful introduction of its Personal Computer, IBM has reestablished the company logo in scientific and engineering applications, which accounted for over half the company's gain in market share in terms of new sites last year, results showed.

But in general, IBM's significant penetration of industrial applications was not attributable to its Personal Computer, the study added.

The past year also saw IBM increase its penetration across a broad range of key application areas, as did several other vendors. Many of the new application areas penetrated by IBM and others were formally the domain of one company, Digital

Equipment Corp.

As a result, DEC will face stiffer competition across all major application areas now and in the future.

DEC Under Pressure

In addition, the study found, DEC's mid-range minicomputer offerings have come under increasing pressure, both from above by new superminicomputers and from below by evermore powerful microcomputers.

The result, in part, was three consecutive quarters of earnings slides and DEC's poorest relative performance in years.

However, Brown said, DEC will experience strong growth in the second half of 1983 and beyond as the

recovery impacts the industrial segments where DEC's high-end offerings sell particularly well.

Apple Computer, Inc. also emerged as a big winner in the Shearson study, the results of which showed Apple's Lisa to have strong market appeal, despite its \$10,000 retail price tag. Apple, Brown said, is Shearson's "best buy" as a suggested stock offering.

Wang Laboratories, Inc. also received high marks from the survey. Brown characterized Wang as a company that "successfully launched off its OS and word processing base using VS to get into other areas of the market."

Data General Corp., however, showed signs of coming apart at the seams, the study indicated. The company has lost significant portions of its user base to other vendors and "chased away its customers," the study said.

It has no low-end offering at present, and the acceptance of new low-end offerings "will be difficult regardless of the technical merits of the system, because it is very hard to regain old customers who have already turned away," according to the Shearson study.

Execs' Departure Reflects Strategy

(Continued from Page 93)

On the down side, Prime seems to be placing too heavy an emphasis on the long-term future (late '80s) and not enough on the short-term future (mid-'80s), Bosomworth said.

This has impaired Prime's ability to compete in some markets, he added.

This long-term emphasis is the complete opposite of Prime's strategy when Fisher was at the helm and is believed to be the reason for his falling out with Prime Chairman David Dunn, resulting in Fisher's abrupt resignation in 1981.

'Secure Handle'

Bosomworth believes Prime's floundering is indicative of the problems facing the minicomputer market in general.

Suffering an assault from "super-micros," minicomputer vendors have been unable to get a secure handle on where their fragmented market is taking them, he said.

The need for a solid plan and entry into neglected markets was reiterated by other analysts, who put the blame more squarely on Prime's shoulders.

While agreeing that industrial capital investment and foreign return on investment have been down at Prime, analysts described its product line as either "reasonable" or not state of the art and too expensive.

"It's old history," said Steve McClellan of Salomon Brothers, a New York investment house. "Right now they are in a very wretched product cycle transition."

"The 850 is drying up, the newly announced 9950 isn't available yet, and they were overaggressive in booking orders this year," McClellan said.

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Exec Sees Big Market for Micros in China Eased Restrictions Seen Beneficial to U.S. Firms

By Robert Batt

CW West Coast Bureau

SANTA CLARA, Calif. — U.S. microcomputer companies are those most likely to benefit from the recent U.S. government decision to ease trade restrictions with the People's Republic of China [CW, July 4].

So says Roderick Macleod, president of International Technology Development Corp. (ITDC), a consulting firm based here which spe-

Cortex Acquires Software Vision

WELLESLEY, Mass. — Cortex Corp. this month announced its acquisition of Software Vision Corp. of Waltham, Mass., for an undisclosed amount of cash.

Software Vision specializes in interactive graphics software packages, including its Executive Data Display System for Digital Equipment Corp. minicomputers.

In a joint development program with DEC, Cortex and its new acquisition will produce Cograph, said to be a menu-driven graphics software package for DEC's Professional 350 micro. Cortex is headquartered at 55 William St., Wellesley, Mass. 02181.

cializes in the Chinese computer market.

Macleod, who also has an office in Shanghai, China, claimed the current economic infrastructure there is not sufficiently well established to cater to a large-scale entry of U.S.-manufactured mainframes.

"Because of technical problems, there is little distributed data processing in China. Electrical shortages are common, and so it is a lot easier to put micros to work there," he explained.

According to Howard Goldman, head of U.S. operations for ITDC, there is great demand in China for personal computer software, which he claimed bodes well for the IBM Personal Computer, Apple Computer, Inc. Apple II and the Commodore Business Machines, Inc. Commodore 64.

Macleod asserted that the recent liberalization of export rules pertaining to high-technology equipment will have a limited impact on trade, despite government claims to the contrary.

"More important is the changing attitude of U.S. businessmen toward China and the decentralization of decision making there which has led to more foreign exchange being available to buy computers," he said.



Photo Courtesy of Infoworld

Roderick Macleod

Addressing modernization strides made within China, Macleod said the Chinese have done a remarkable job with their computer institutes. "They teach and train staff, make the chips and peripherals, develop the software and carry out research and development. The result is that they have got way ahead of their user environment and don't have enough demand for what they do," he noted.

The lack of a strong user influence, Macleod said, means the Chinese computer professionals have

very different attitudes toward U.S. DPers when it comes to matters such as project management, on-time delivery and quality control. "Such things are not readily understood because they don't have users demanding those things," he commented.

Macleod also asserted that the lack of computer consultants in China has led to an inherent misunderstanding about software. Management systems are primitive compared with the U.S., and this will further hamper the development of the computer industry in China, he attested.

In the short term, he added, most computer usage will be concentrated in the manufacturing sector rather than the business environment. The Chinese, he said, are particularly strong in areas such as fabrication and assembly, but the country currently lacks the broad industrial base needed to support such operations.

To take advantage of the opportunity, Macleod warned, U.S. manufacturers must drop what he termed their parsimonious attitude. "American businessmen think they can go to China and make a deal within 48 hours, as opposed to the Japanese who send whole teams of people for weeks and months at a time to secure a contract. The Japanese are currently walking away with the business in China because U.S. businessmen are not willing to spend the money needed to get established," he said.

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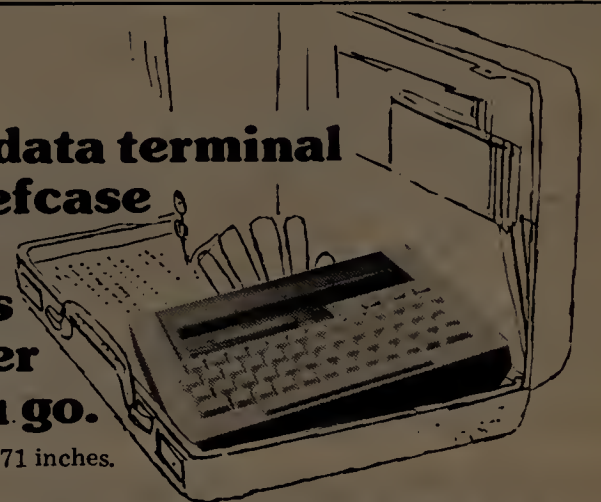
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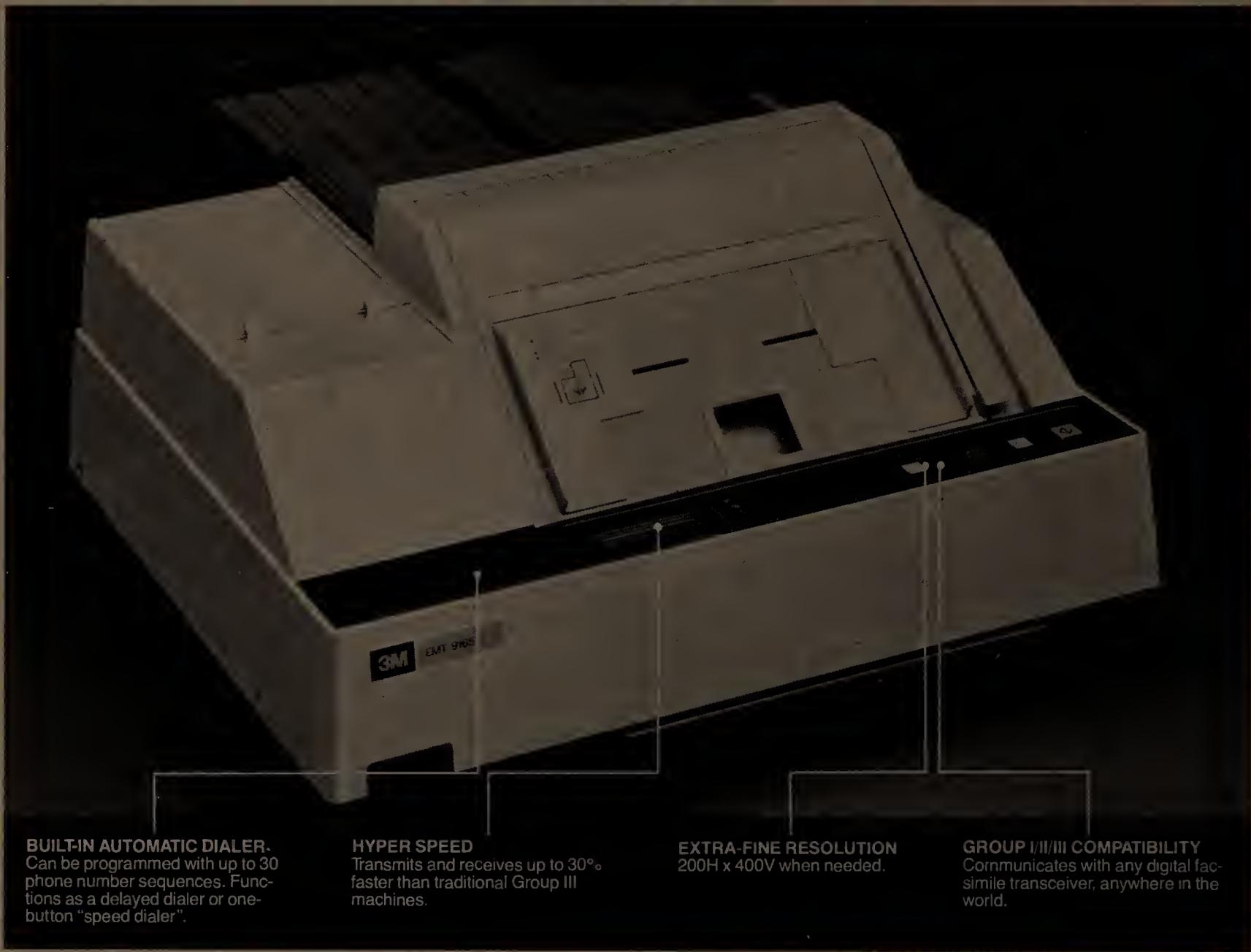
STAMFORD, Conn. — Apple Computer, Inc. announced this month that it is offering, in cooperation with General Electric Credit Corp. (GECC), a credit card and revolving account for purchase of its products.

Designed by GECC for Apple's U.S. network of 800 retailers representing more than 1,400 stores, the Apple card is available now and will enable customers to purchase Apple computers and system components without drawing on other lines of credit. Finance charges will be competitive with bank card charges, which vary according to state regulations, GECC said. GECC will perform all credit, collection and account maintenance services.

Consumers will be able to apply for an Apple card at any participating authorized dealer at the time of purchase of an Apple computer.

In most cases, according to Apple and GECC, credit will be authorized while the customer waits.

To qualify for the card, the consumer must purchase an Apple personal computer and finance a minimum of \$825; up to 90% of the initial purchase can be charged by qualifying customers. Buyers will receive their cards in the mail for future use in purchasing at least \$100 of add-on equipment, software and new equipment.



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The EMT 9165's dual polling mode is a good example. It lets you do either of two things: (1) poll other Group III machines in the usual way, or (2) send traffic to and obtain documents from

other EMT 9165s with a single call to each machine, so that you eliminate the added expense of double phone calls.

3M's EMT 9165 also helps to lower communication costs by providing a detailed audit trail through two types of status reports, including one that supplies a department or personal ID number for each call.

Other major features include: Automatic time and date stamping of incoming and outgoing traffic. Alphanumeric display for prompting casual operators and to help in programming the machine for "one-button" operation. Two-digit ID numbers as pass-

words, if required.

Special Applications: Modular design. 3M-I computer store-and-forward system that interfaces with data networks and supporting protocols such as SNA, HDLC and X.25.

For details on the new EMT-9165 and the full line of 3M electronic message terminals, call 1-800-328-1684 toll-free. (In Minnesota, 1-800-792-1072.) In Canada, call 1-800-268-9055, Operator 11. Or mail the coupon to: 3M Business Communication Products Division, 3M Center, Building 216-2N, P.O. Box 33600, St. Paul, MN 55144 Attn: G. Collins.

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Business Communications Products Division

3M hears you...



Venture Gears Up For Next Step

(Continued from Page 95)

the System/38, despite the fact that the majority of the System/38 shops are using RPG-III rather than Cobol. The traditional RPG software houses and consulting firms are fairly small because they have been working with a low-price market (System/3 and System/34).

This leaves companies like RTC Systems with "a little niche in the market," Robinson continued. "And this is why the firm took the plunge and risked the earnings from its consulting days to plunge headlong into package development."

"Now we have the extra capital to go further and tie it into some other areas that relate to the System/38," he said.

Consulting Group

Robinson started RTC Systems 2½ years ago with two associates. The company began as a consulting group specializing in customized RPG-III-based System/38 software. After a year, the firm branched into the packaged software area, and now RTC Systems is set to deliver to market an integrated line of products. When interviewed last month, Robinson noted that RTC Systems anticipated receiving venture capital funding from a firm specializing in the DP industry.

He already is predicting that the firm will outgrow its six-month-old facility by January 1984. He expects the current staff of 40 to nearly double in size by the end of September.

RTC began marketing its product around April 1 on a full scale and has set up a sales office in Philadelphia. There are plans to open additional offices nationally and to increase international distribution of RTC software.

RTC plans to expand its efforts in the education and research and development areas.

Computer Sales Rising, But Slowly: EIA Study

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — U.S. computer manufacturers continued to feel the effects of high interest rates, the strong U.S. dollar and recession-softened overseas markets last year as their sales grew only 11% over 1981, according to the Electronic Industries Association (EIA).

That increase brought U.S. factory sales of computers and peripheral products to \$31.2 billion last year, up from \$28.1 billion the year before, the EIA reported in "1983 Electronic Market Data," its annual publication of industry statistics. In comparison to 1982's performance, EIA noted that industry sales increased 15.5% in 1981.

Total 1982 digital mainframe computer sales for U.S. manufacturers were \$11.76 billion, up 15% over 1981's \$10.22 billion. With the increased competition mainframes face from high-capacity minicomputers and microcomputers, the EIA noted predictions that the market share of mainframes will continue to decrease, from a high of 80% in 1976 to about 33% by 1985.

Describing superminicomputer sales as "the fastest growing segment of the market," the EIA report quoted a variety of sources suggesting 1981 sales were as high as \$1.2 billion and are growing as much as 32% to 35% a year. Minicomputer sales continued strong as well, with 1981's sales totaling \$7.2 billion; sales

in this category are expected to rise to more than \$12 billion in 1986.

Sales estimates for the microcomputer market vary, EIA noted, quoting one source that suggested 1982 sales for this category, including everything from \$100 home computers to \$30,000 business machines, reached \$6 billion.

Some analysts expect this segment to experience a 40% annual compounded growth rate between 1980 and 1986, EIA said, adding that one research firm expects annual U.S. sales of micros to be about \$20 billion in 1986 and more than \$37 billion by 1991. After-market sales could push

the 1991 figure to \$70 billion, EIA added.

The study said U.S. sales of the business and professional part of the personal computer market, consisting of machines costing less than \$10,000, topped \$3 billion last year. And one analysis put last year's market for this personal computer hardware, including peripherals, at \$4.4 billion and expects it to grow to \$18.4 billion by 1987.

Sales in 1982 of desktop computers priced below \$10,000 brought the installed base last year to nearly five million units, valued at more than \$8 billion, with the U.S. supplying

about 60% in both value and numbers while Japan and Europe each supplied 20%, EIA said.

EIA further said that based on the work of one research group, "the surge in business personal computer revenues will reach its peak and taper off to extremely modest levels by 1992, when the personal computer market will be absorbed by the multifunction workstation field. This will amount to approximately \$14 billion annually in 10 years' time," EIA added.

In the small business systems area — covering systems priced from \$5,000 to \$100,000, EIA reported that vendors are expected to enjoy sales of \$9.96 billion in 1986, an annual growth rate of nearly 23% over 1981 sales of \$3.5 billion.

Revenues in software — which EIA called "the decisive factor in the computer market" now that hardware prices are declining so rapidly — totaled \$3.1 billion in 1982 for U.S. companies, according to one estimate quoted by the EIA, which would put last year's sales growth at 45%. In addition, one estimate had this market segment growing by as much as 500% by 1986.

As for U.S. peripherals sales, EIA quoted U.S. Commerce Department figures showing that 1981's total of \$13.4 billion grew 10% last year to \$14.72 billion. Those figures include \$1.7 billion in factory shipments of printers in 1982, up 14% from \$1.5 billion in 1981.

EIA Market Figures Reveal Robust, Growing Industry

WASHINGTON, D.C. — The Electronic Industries Association's (EIA) most recent market figures show that the industry, although still relatively young, is not only large and internationally robust, but continues to grow rapidly despite the worldwide recession.

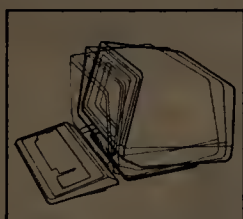
According to the EIA's 1983 compendium industry data, the world market for electronic equipment, systems and components easily topped \$355 billion last year. U.S. factory sales totaled

\$126.1 billion, a 7.9% increase over 1981's \$116.1 billion. Total sales in Europe were in the \$90 billion range, and the Japanese market came close to \$50 billion.

U.S. sales of industrial electronic products, including computers and related products sold to commercial markets, accounted for almost 40% of the industry total, surpassing the 1981 sales total of \$45.2 billion to reach \$50.2 billion.

Communications equipment
(Continued on Page 100)

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*We can emulate all models of the 7800 family.

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A menu-style setup mode eliminates all cumbersome switches. Other human-engineered features include high density 7 x 9 dot matrix characters (7 x 11 in lower case), 25th status line, N-key roll-over and audible keyclick.

Plus, you get 12 user-programmable nonvolatile function keys; block and character transmission; blink, underline, reverse; full editing and programmable nonvolatile columnar tabbing or field tabbing, forward and backward.

And if you order the new TEC 780x in volume, you can save even more than 40%.

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MIS Vendors Get Bigger Slice

Apple Exec Disputes IBM's Role as Top Producer



Floyd Kvamme
CW Photo by J. Beeler

By Jeffry Beeler

CW West Coast Bureau

PALO ALTO, Calif. — Corporate management information systems (MIS) departments serving as vendors to their own users collectively represent an even bigger computing services producer than the industry's supposed leader, IBM.

That opinion was expressed here recently by Floyd Kvamme, Apple Computer, Inc.'s executive vice-president of marketing and sales.

Keynoting the Technology Trends Conference sponsored by Shearson/American Express, Inc., Kvamme labeled a "misconception" the prevailing view that IBM is the chief com-

puting products vendor.

Kvamme likened large central MIS departments to independent systems integrators. Although the two types of organizations serve radically different markets, both groups typically refer to their consumers as "users," he said.

Like systems integrators, corporate DP departments also acquire hardware and software from dozens of outside sources, combine the modules to form finished services and then make the results available to their target customers, Kvamme added.

So "the prime job" facing independent vendors like Apple and oth-

ers, he explained, "is to sell their products to systems integrators, who are the analysts" and other computing professionals within large corporations.

Kvamme also challenged the popular notion that computer literacy is synonymous with the ability to program. As it applies to personal computers, literacy means knowing how to use programs rather than how to create them and is more akin to "driver training than to auto mechanics," he said.

The "myth" that success in using personal computers requires programming expertise has been largely debunked, he said. To illustrate his point, Kvamme cited recent data indicating that about 70% of all personal computer owners have no firm plans to learn how to design applications and write code for their machines.

The Apple executive also predicted an increased emphasis among personal computer manufacturers on making their products "intuitively" easy for nontechnical users to operate. He also foretold movements in the personal computer field toward enhanced processing power, reduced hardware size and expanded networking capabilities.

EIA Figures Show Industry In Rapid Growth

(Continued from Page 99)

and systems accounted for another 30.6% of total electronics shipments. Sales in this category came to an estimated \$38.6 billion, an 11% increase over the 1981 total of \$34.8 billion. Factory sales of electronic components totaled \$26.1 billion in 1982, a 3.5% increase over 1981 sales of \$25.2 billion.

The consumer category suffered a 4.1% decrease in factory-level sales last year, falling to \$11.2 billion from the \$11.7 billion of the previous year. Consumer electronics accounted for 8.9% of the 1982 total industry sales volume.

The EIA data book estimated 1,619,400 persons were employed in electronics manufacturing and related activities in 1982, representing a 2.3% increase over the 1981 total of 1,582,300. U.S. exports of electronic products came to \$24.28 billion in 1982, and imports totaled \$21.04 billion, resulting in a balance of trade surplus of \$3.24 billion.

The EIA's "1983 Electronic Market Data Book" — 154 pages of facts, figures, charts and graphs — contains separate sections on computers, communications systems and equipment, consumer and government electronics, electronic components, international trade, employment and research and development expenditures.

The book is available for \$55, with discounts for multiple copies, from Electronic Industries Association, Marketing Services Department, 2001 Eye St. N.W., Washington, D.C. 20006.

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Honeywell Boasts Significant Steps With DPS 6

By Patricia Keefe
CW Staff

WALTHAM, Mass. — Brushing aside speculation that it may be entering the small business systems market with too little, too late, Honeywell, Inc. said its expanded DPS 6 line, which offers "a level of power and connectivity no one can match today," is a "significant step forward" for the firm.

Introduced this month [CW, July 18] were the Microsystem 6/20, a multiuser micro intended for use as a departmental office system, and the DPS 6/40 micro-based minicomputer system, geared toward heavy transaction processing and data communications use in an interactive Cobol environment. Both systems offer compatibility with IBM Systems Network Architecture (SNA), Binary Synchronous Control and Synchronous Data Link Control, prompting Frank J. Murphy, director of Product Marketing Support, to quip, "I believe we are more compatible with IBM's SNA than IBM is."

The marketing strategy behind the compatible DPS 6 family is indicative of Honeywell's efforts to "change its image." Noting that Honeywell was previously "not customer-sensitive enough in terms of quality," Alan F. Atkinson, vice-president of the newly formed Small Computer Marketing Operations, said things have changed. "And the people at Honeywell realize it; they

are working more closely together as a team," he said, adding "I don't think the salespeople have been on such a high in a long time."

"We are committed to keeping [this] business, and you'll see quite a bit in the way of change — leaner, tougher products," Atkinson maintained, adding that there has been a refocus of Honeywell's marketing strategy.

Honeywell's small business systems efforts are aimed at "mature users" who realize that the "need to have compatibility far outweighs the sex appeal of multifunctionality." Its late entry into the market is not a problem, according to Murphy, because while Honeywell is offering a distributed data processing (DDP)

"solution," it will be difficult to sell until people recognize that the problem does exist. And that is the stage Honeywell believes the market is just now entering.

Comparing the DPS 6 line with Digital Equipment Corp.'s version, Murphy said that "DEC takes four operating systems to do what we cover with one." Both Dale Kutnick of the Yankee Group and "EDP Industry Report" give some credence to Honeywell's claims.

Kutnick said Honeywell "was the first vendor to do things on all four levels," which includes IBM 3270 and X.25 communications, high-level language compatibility, file compatibility and applications subset compatibility.

The Yankee Group report, in its April 30 issue, suggests that one of the key forces in micro-based DDP is compatibility, adding that "only Honeywell has pushed for total instruction set compatibility for its micros, minis and mainframes."

Hoping to address the micro-mainframe incompatibility problems currently plaguing many corporate installations as they gallop toward networks of desktop computers, Honeywell has prepared for the strength of IBM's installed base across the board by incorporating IBM compatibility into its product line. And, in a pricing move, the DPS 6/40, aimed at the IBM Series 1 and System/36 and DEC VAX-11/730, is said to be 25% to 30% lower in price.

DG Program Effects Shipment Within 24 Hours

WESTBORO, Mass. — Data General Corp. has announced a new program that will allow terminals and printers to be shipped within 24 hours after a telephone order is received, whether from end users or OEMs.

General Express will make available on a 24-hour demand basis the DG Dasher D100, D200, D400 and D450 series terminals, as well as the Dasher 300 graphics terminal. Printers available through the program include the Model 4422 and 4433 dot-matrix versions, both of which are compatible with DG's Micronova, Nova Commercial and Eclipse systems.

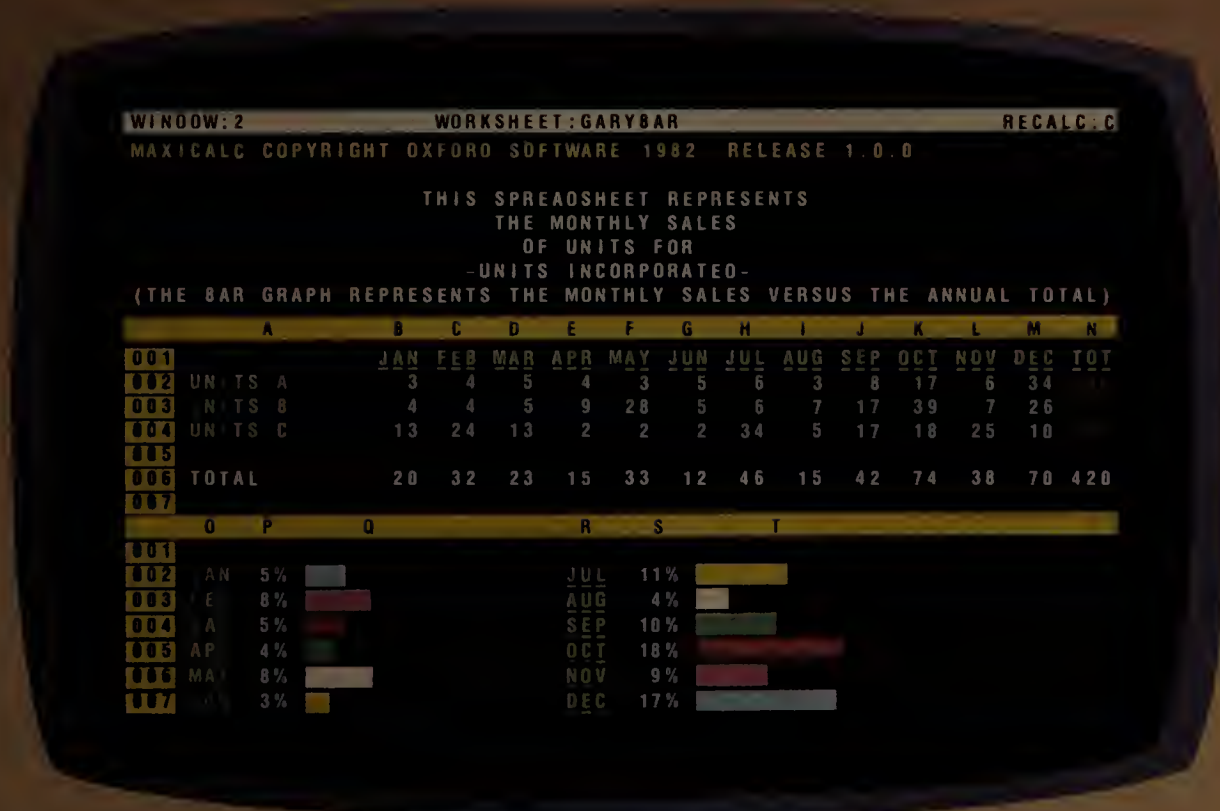
More information on the program is available from Data General Express at 4400 Computer Drive, Westboro, Mass. 01580.

Firms Join to Acquire 80% of Starnet Corp.

SAN DIEGO — In a diversification and expansion move, United Brands Co. announced it has reached an agreement with Greater Media, Inc. to acquire 80% of Starnet Corp., provider of interstate long-distance telephone service.

United said its entry into the long-distance market is "a logical expansion of its existing telecommunications interests under TRT Telecommunications Corp.," an international record communications carrier.

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MAXICALC's completely variable column widths assure unequalled flexibility...as illustrated in the sample spreadsheet shown above. And the large size of the worksheet...512 rows by 64 columns...lets users create the kind of spreadsheets they want.

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Equally important, MAXICALC's full color support and graphics capability assure you that it will meet your needs into the future.

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Court Sustains Motorola Claims

SCHAUMBERG, Ill. — A U.S. District Court in Chicago has sustained allegations made by Motorola, Inc. that three former employees and their company, Computer

Displays International, Inc. (CDI), were using Motorola information in violation of an earlier court injunction, according to Motorola.

The ruling entered by Judge Susan Getzendanner said that a recent model of a CRT display monitor marketed by CDI is essentially equivalent to the display monitor that CDI was previously enjoined from making or selling, Motorola claimed.

The original suit, filed by

Motorola in March of 1982, charged that the three defendants misappropriated confidential Motorola information and technology related to the Motorola DS3000 and DS4000 series of display monitors.

The suit also charged the defendants with infringing on a Motorola trademark and copyrights in connection with CDI's sale and production of its MPG series of display monitors.

Punitive Damage Award Against Mohawk Set Aside

PARSIPANNY, N.J. — A \$15 million punitive damage award against Mohawk Data Sciences Corp. has been set aside by a District Court judge in the U.S. District Court in Massachusetts, Mohawk announced recently.

Concurrently, compensatory damages against Mohawk of \$2.3 million were doubled under Massachusetts law.

The \$15 million award had previously been awarded by a jury in May in connection with an action brought by a former Mohawk distributor in 1979 alleging wrongful termination of a distributorship agreement between Burlington, Mass.-based Computer Systems Engineering and MDS Qantel, a Mohawk subsidiary.

Directory Lists Rentals

FOSTER CITY, Calif. — A selection of data terminals and electronic test equipment available for rent is listed in a catalog published recently by Leasametric, Inc.

The illustrated 288-page catalog lists more than 1,000 products, most of which are available for rent within 24 hours from the company's four inventory centers in the U.S.

The catalog lists short technical descriptions and rental rates of products in five main categories: general-purpose electronic test equipment, industrial, data terminals, telecommunications test equipment and microprocessor test and development systems.

The section on data terminals includes desktop computers, graphics and interactive CRT terminals, printers, acoustic couplers and modems and store-and-forward devices, according to the vendor.

The catalog is available free of charge from Leasametric, 1164 Triton Drive, Foster City, Calif. 94404.

Forecasts & Findings

As field service revenues become more important, computer manufacturers need to expand the customer services they offer, according to Key Service Trends and Issues, by Input, Inc.

User resistance to changes in field service costs have now reached the point where single-digit, year-on-year increases have become the norm, which will substantially reduce the growth of service revenue unless alternative revenue sources are found, according to the report.

The trend toward lower services prices is supported by IBM, which is introducing new products with maintenance costs only 30% of the cost of maintaining the older products now being replaced, according to the report.

The report costs \$600 from Input, located at 1943 Landings Drive, Mountain View, Calif. 94043.



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taking care of low level communications so as not to interrupt the CPU.

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The performance that results is close to that of a VAX™ 11/780.

And costs about \$200,000 less.

The Plexus Family. Speedsters all.

There's our Z8000 series, the economical 16-user P/25, or the 40-user P/40.

Or choose the newly introduced P/35 or P/60 models for 32-bit performance.

They're both based on the 12.5 MHz MC68000. With the addition of a few, shall we say, high performance modifications.

Like an on-board 4K cache memory. 16K of high-speed on-board RAM. A high-speed memory map. And a 32-bit memory path.

Supershorts

The University of California at Santa Cruz has received a gift of \$25,000 from the Honeywell Foundation to aid in the expansion of the university's science library. * * *

Xebec Systems, Inc. will establish a separate corporation, Information Memories Corp., for the production of thin-film media — a memory disk product used for storage of information in rigid disk

drives requiring higher storage volume. * * *

Convergent Technologies, Inc. has received a \$31 million contract from Computer Consoles, Inc. for computer systems that will be used in CCI's Officepower office automation system. * * *

Anacomp, Inc. is forming a Videoserv Charter Group which will allow financial

institutions to participate in the implementation of Anacomp's Videoserv 2000 video terminal system. The charter subscriptions are open to any organization in the banking community interested in home financial services. * * *

Northern Telecom Ltd. has signed a cooperative agreement with the Daewoo Group of Korea. Under the agreement, Northern Tele-

com will work with the Daewoo Group in establishing semiconductor manufacturing facilities in Korea. * * *

The Santa Clara, Calif., City Council has given its approval to Campeau/Small Properties and Doubletree, Inc. for the construction of the \$150 million Santa Clara Trade and Conference Center. The center will house Techmart, a high-technology

merchandising mart, and a 500-room Doubletree hotel. * * *

Milton J. Pfarr Jr., a Burroughs Corp. employee, has been awarded \$100,000 as part of the company's employee suggestion award program, the largest single award since the program was started in late 1981. Pfarr developed a system for changing print wheels in terminal teller machines that cuts the time customers have to do without the machines from four to six hours to one hour or less. * * *

Texas Instruments, Inc. has been chosen by the Professional Resource Organization (PRO), a subsidiary of the National Association of Professional Insurance Agents, as the computer hardware vendor in a pilot program designed to provide PRO members with the information they need to market a low-cost, industry-specialized computer package. * * *

Digital Equipment Corp. and Voicemail International, Inc. have announced a joint agreement to market Voicemail's Big Talker voice processing product. The Voicemail proprietary technology will be combined with DEC's office automation products to provide total voice transmission facilities. * * *

Prime Computer, Inc. has reached an agreement in principle with Logan Associates, Inc. of Henley-on-Thames, UK, giving Prime exclusive worldwide marketing rights to Logan's Locam, a system for computer-aided process planning in discrete manufacturing environments. * * *

Vector Graphic, Inc. has announced an agreement to distribute Scientific Marketing, Inc.'s Market Fax, a client/prospect data base manager and marketing support software program, through Vector dealers. * * *

Wang Laboratories, Inc. and Omron Tateisi Electronics Co. have purchased licenses from Drexler Technology Corp. for Drexler Laser Memory Card equipment technology. The \$250,000 license fees give Wang and Omron the prototype designs and technology for write/read equipment utilizing laser cards for software loading, data recording and information storage. * * *

Martin Marietta Corp. has joined the Microelectronics and Technology Corp., a joint research and development venture. * * *



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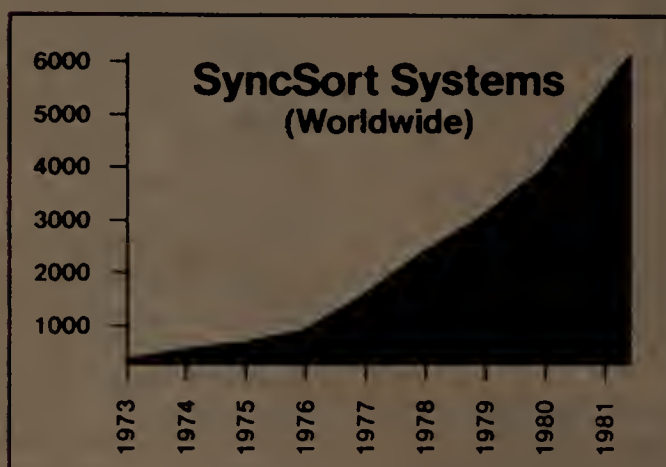
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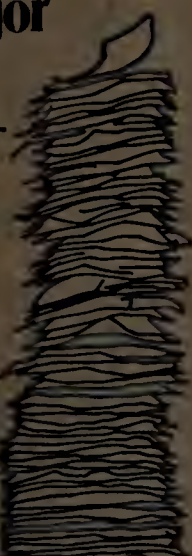
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SYSTEMS PROGRAMMERS

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As our SUPERVISOR of Systems Programming, you will be expected to make significant contributions in the migration from MVS/SP 1.1 to MVS/SP 1.3, and installation of VM, IMS/VS Data Base; and IDMS Data Base and on-line development tools. You will direct the technical support activities of our Management Systems Department, including systems programming, technical programming support and telecommunications. In addition, you will provide technical guidance to Software Programmers in the evaluation, planning and implementation of software, hardware and telecommunication systems. In addition to the new products being installed, the software being used at ITT Telecom includes JES2/NJE, ACF/VTAM/MSNF, CICS/VS, UCC-1 (TMS), HSM, ACF2, ACF/NCP (COMTEN), OMEGAMON, ROSCOE, LIBRARIAN, TSO/SPF and PANVALET.

SENIOR SYSTEM PROGRAMMER

As a Senior System Programmer, you will be integrally involved in the migration from MVS/SP 1.1 to MVS/SP 1.3, and installation of VM and IMS/VS Data Base. Knowledge of one or more of these products is necessary, as well as skill in the use of SMP to install and support these and other products. In addition, you will be expected to provide guidance and direction to less experienced System Programmers in the use and maintenance of these products. Other software currently in use at ITT Telecom includes JES2/NJE, ACF/VTAM/MSNF, CICS/VS, VCC-1 (TMS), HSM, ACF-2, ACF/NCP (COMTEN), OMEGAMON, ROSCOE, LIBRARIAN, TSO/SPF and PANVALET.

In addition to excellent salaries and very comprehensive benefits, our location is another big reason to make that all-important career move to ITT Telecom. Within a few hours drive of both the beautiful Great Smokies and the uncrowded North Carolina beaches, Raleigh offers a bountiful collection of cultural, recreational and educational pleasures. Relocation assistance will be provided; a full-time Relocation Coordinator is on staff to assist with your relocation from beginning to end. To become a member of the number one team in telecommunications, send your resume, indicating position of interest, in strict confidence to: Senior Technical Recruiter, Department CW.ITT Telecom, 2912 Wake Forest Road, Raleigh, North Carolina 27611.

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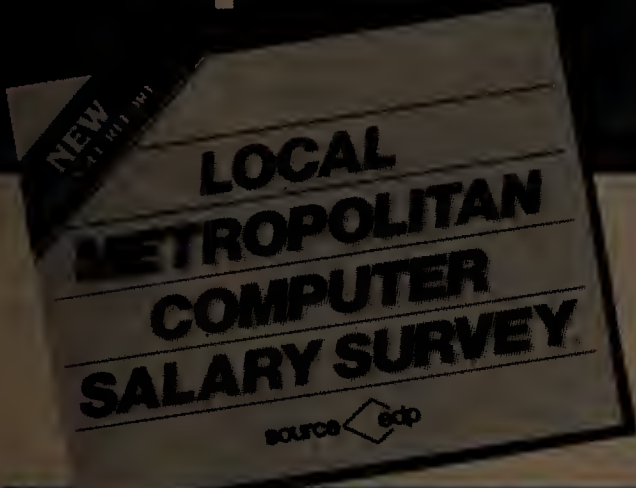
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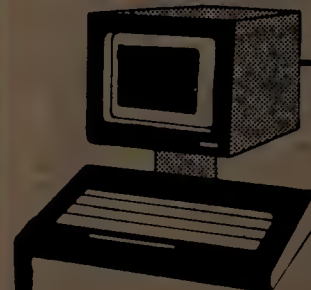
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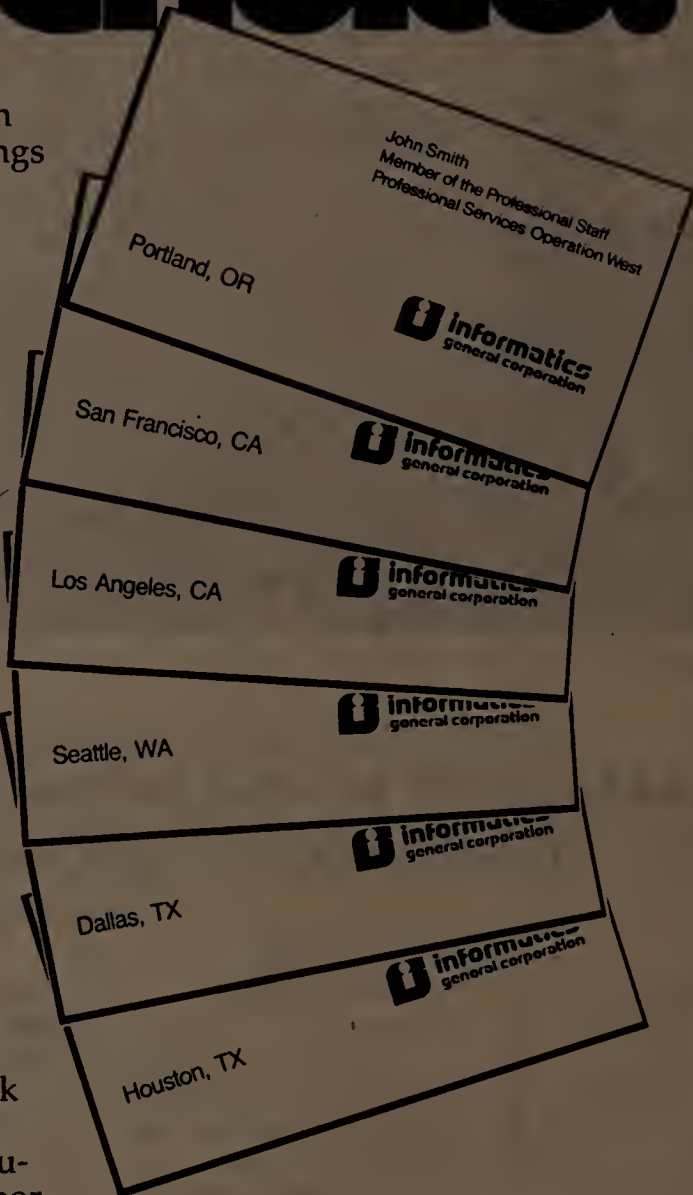
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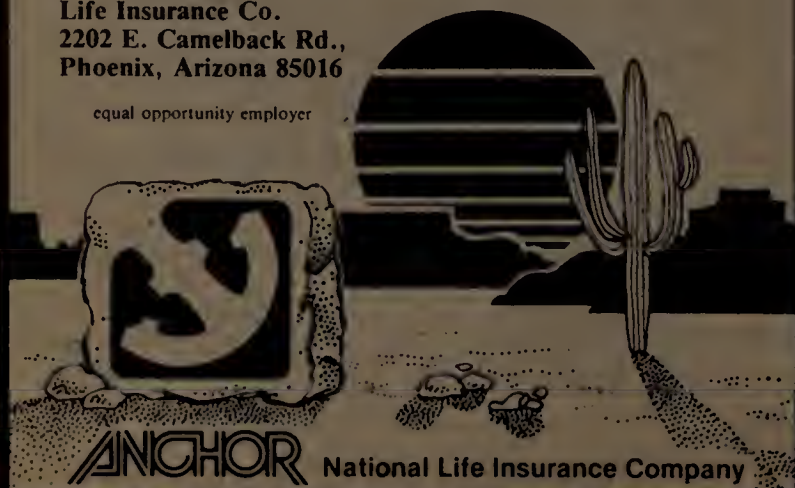
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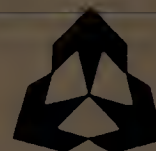
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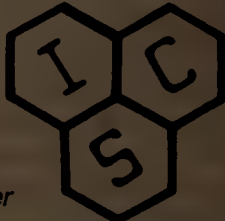
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
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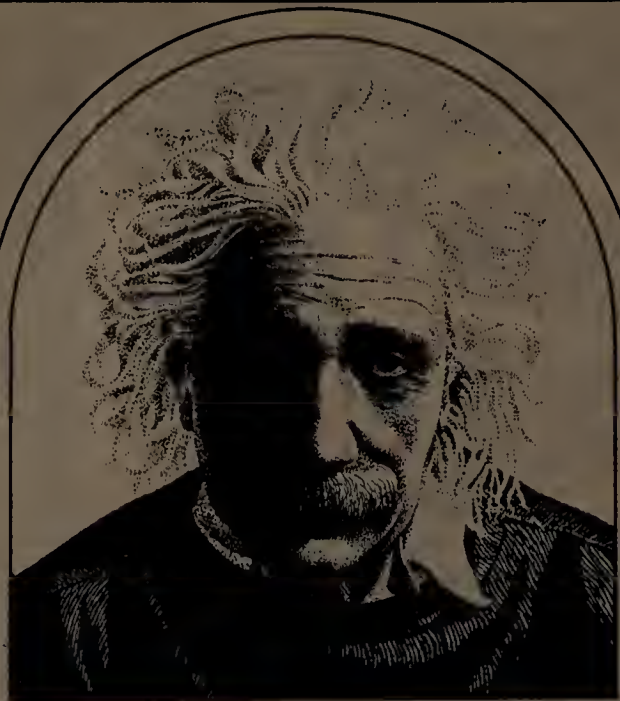
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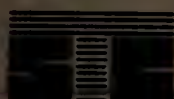
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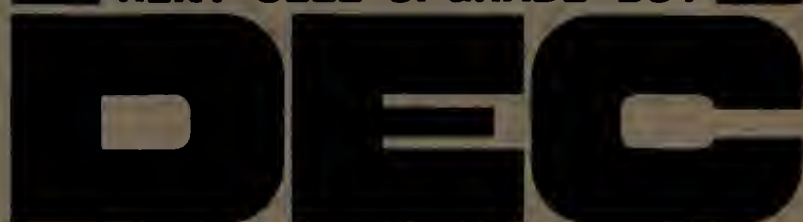
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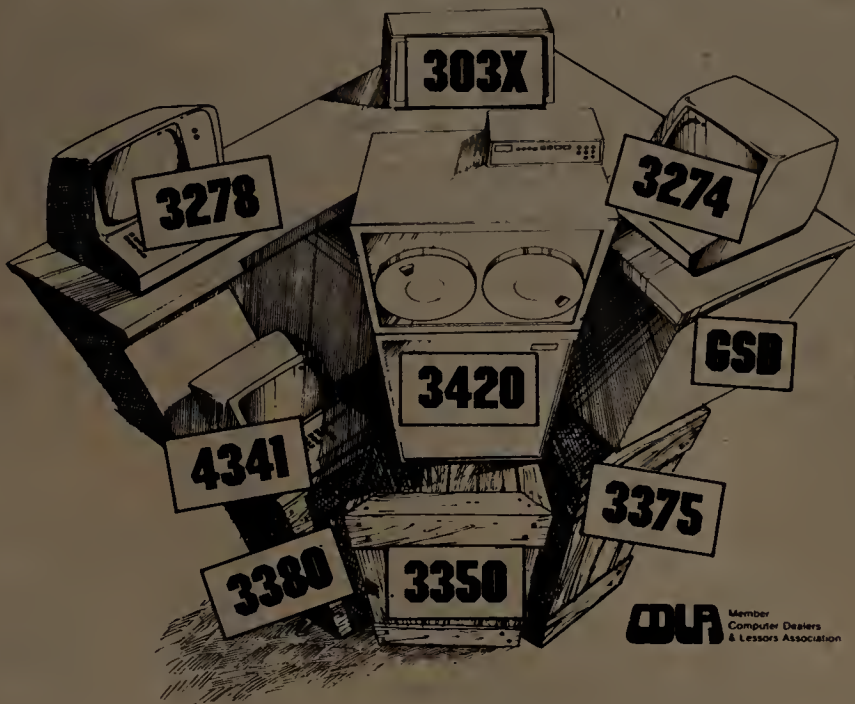
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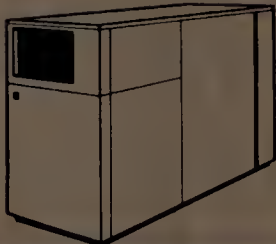




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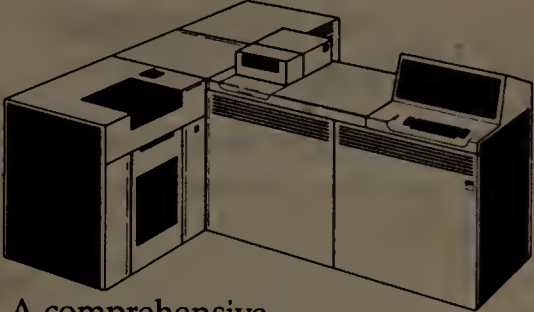
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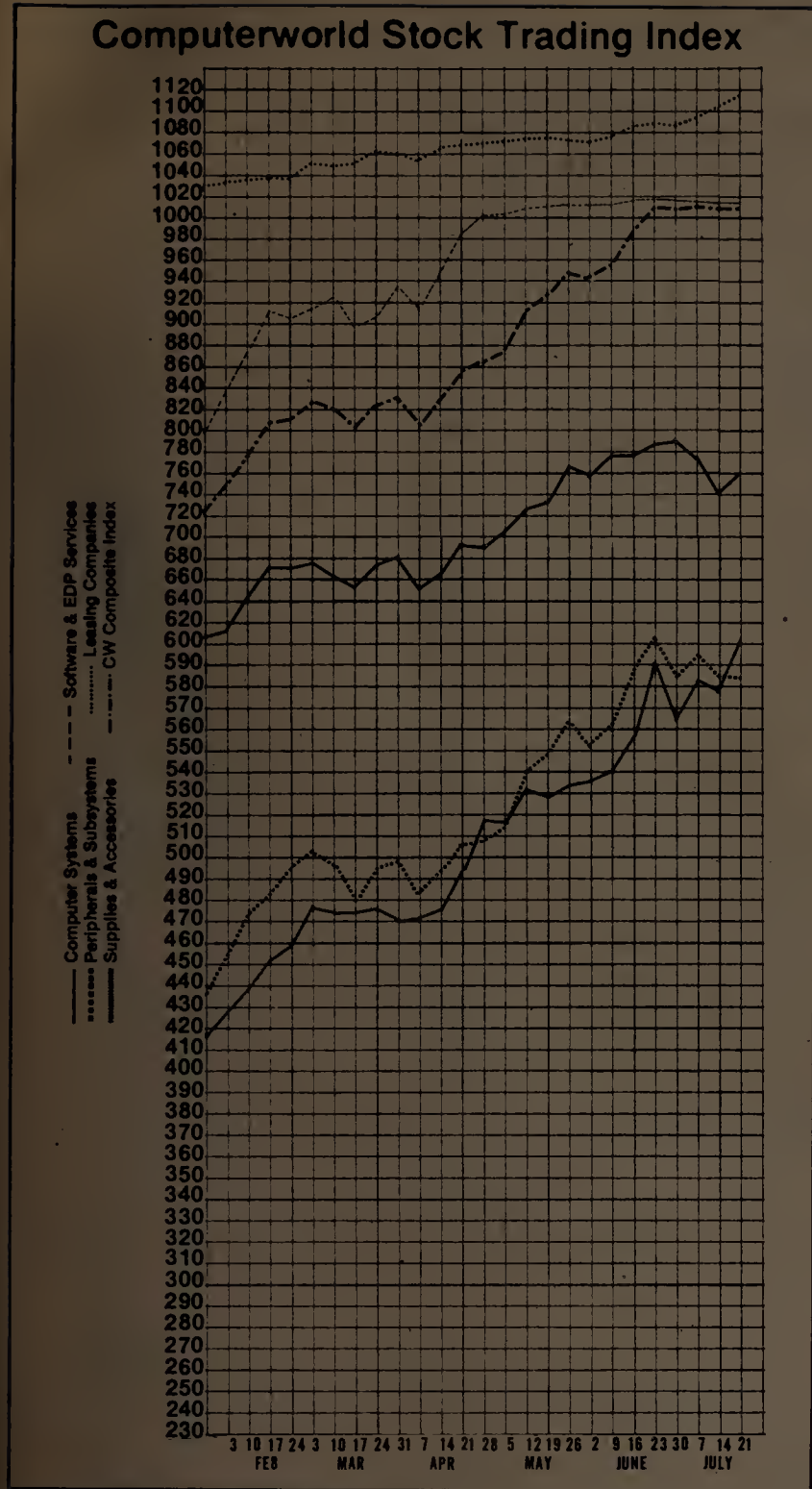
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					CLOSING PRICES WEDNESDAY, JULY 20, 1983									
E X C H	1982-83 RANGE (1)	PRICE CLOSE JUL 20 1983	WEEK NET CHNGE	WEEK PCT CHNGE	E X C H	1982-83 RANGE (1)	PRICE CLOSE JUL 20 1983	WEEK NET CHNGE	WEEK PCT CHNGE	E X C H	1982-83 RANGE (1)	PRICE CLOSE JUL 20 1983	WEEK NET CHNGE	WEEK PCT CHNGE
COMPUTER SYSTEMS					SOFTWARE & EDP SERVICES									
A AMOHL CORP	8-30	25 1/4	+ 1/8	+0.4	O ADVANCED COMP TECH	1- 8	6	- 1/2	-7.8	O COMPUTER DEVICES INC	4-21	9 3/4	-1 1/8	-10.3
N BURROUGHS CORP	28-58	54 1/2	+3 7/8	+7.6	O ADVANCED SYSTEMS INC	6-22	18 3/4	0	0.0	O COMPUTER TRANSCIVER	4-12	8 3/4	0	0.0
O COMPUTER AUTOMATION	7-17	14 1/2	- 1/2	-3.3	O AGS COMPUTERS INC	7-30	28 1/8	- 1/8	-0.4	N COMPUTERVISION CORP	19-53	49 1/2	+3 7/8	+8.4
A COMPUTER CONSOLES	8-26	25 5/8	+3	+13.2	O AMERICAN SOFTWARE	21-31	28	+ 1/2	+1.9	N CONRAC CORP	17-38	20 5/8	-1	-4.8
N CONTROL DATA CORP	21-82	58 1/4	+1 3/8	+2.4	N ANACOMP INC	9-23	11 5/8	-3 1/2	-23.1	A DATA ACCESS SYSTEMS	1- 4	1	0	0.0
N CRAY RESEARCH INC	20-52	46 3/8	- 1/8	-0.2	O ANALYSTS INTL CORP	5-20	20	+3 1/2	+21.2	A DATAPRODUCTS CORP	16-41	27 3/8	+ 1/8	+0.4
N DATA GENERAL CORP	20-73	57 7/8	+3 5/8	+5.8	A APPLIED DATA RES.	8-37	29 7/8	- 1/2	-1.6	A DATARAM CORP	5-12	10 5/8	0	0.0
N DATAPoint CORP	11-38	20 5/8	+ 1/2	+2.4	O ASK COMPUTER SYSTEMS	12-35	34 1/2	+ 3/4	+2.2	O DATUM INC	2-17	14 3/8	+1 1/4	+8.5
N DIGITAL EQUIPMENT	82-132	115 7/8	+ 1/2	+0.4	S ASTRADYNE COMP INC	1- 7	4 3/4	- 5/8	-11.8	O DAVIO JAMISON CARCYL	2- 7	3 1/8	- 1/4	-7.4
A EECO INC	8-18	15 1/2	+1 5/8	+11.7	N AUTOMATIC DATA PROC	21-44	44	+ 3/4	+1.7	O DECISION DATA COMPUT	3-18	12 7/8	0	0.0
N ELECTRONIC ASSOC.	5-15	14 1/4	+ 1/4	+1.7	O CDA COMPUTER ASSOC	5-15	13 5/8	+ 7/8	+8.8	O DELTA DATA SYSTEMS	1- 4	2 3/4	- 1/8	-8.2
N FLOATING POINT SYST	15-44	40 1/2	+ 1/2	+1.2	O COMPUTER ASSOC INT'L	8-35	31	-2	-8.0	N ELECTRONIC M & H	5-11	9 3/8	- 3/8	-3.8
N FOXBORO	22-47	38 3/8	- 3/8	-0.9	O COMPUTER HORIZONS	8-20	18	- 3/4	-4.0	O EVANS & SUTHERLAND	18-50	47	+1	+2.1
O FULCRUM COMP ORP	1- 3	1 1/4	0	0.0	O COMPUTER NETWORK	4-10	9 3/4	- 1/8	-1.2	O GANDOLF TECHNOLOGIES	10-22	12	0	0.0
O GENERAL AUTOMATION	3-18	14	+ 1/2	+3.7	N COMPUTER SCIENCES	11-23	18	- 1/4	-1.2	N GEN'L DATA COMM INC	5-29	24 1/2	+1 1/8	+4.8
N HARRIS CORP	20-51	47 1/2	+2	+4.3	O COMPUTER TASK GROUP	8-22	15 3/4	- 3/4	-4.5	O GENERAL TERMINAL CP	1- 2	1 1/2	0	0.0
N HEMLETT-PACKARD CO	36-86	93 3/8	+7 7/8	+8.2	O COMPUTER USAGE	2-22	18 1/2	+1 1/2	+8.8	O GREAT SOUTHWEST INC	2- 5	2	0	0.0
N HONEYWELL INC	80-124	122 1/2	+10 7/8	+8.7	O COMPUTONE SYSTEMS	15-38	16 1/2	-1	-5.7	N HAZELTINE CORP	7-31	24 3/8	- 7/8	-3.4
N IBM	57-125	125 3/8	+4 1/8	+3.4	O CONSERV CORP	10-20	12 1/4	-2 3/4	-18.3	O ICOT CORP	3-10	7 1/4	- 3/8	-4.9
O IPL SYSTEMS INC	5-14	12 1/4	+1	+8.8	O CONSHARE	5-13	11 3/8	+ 1/8	+1.1	O INFORMATION INTL INC	10-22	18	+1 1/2	+9.0
O MADONSON COMP SYST9	2- 5	1	0	0.0	N CULLINET SOFTWARE	12-50	43 7/8	+ 5/8	+1.4	O INTEL CORP	11-40	39 1/4	+1	+2.6
N MANAGEMENT ASSIST	7-18	10 7/8	-2 3/4	-20.1	O CYCARE SYSTEMS INC	9-27	20 1/2	0	0.0	O IPL SYSTEMS INC	5-14	12 1/4	+1	+8.8
O MINI-COMPUTER SYST	1- 2	2 1/8	- 1/2	-18.0	O DATA DIMENSIONS INC	1- 2	3/4	0	0.0	A LUNDS ELECTRONICS	7-15	17	-2	-10.5
N MODULAR COMPUTER SYS	8-16	18	+2 3/4	+20.7	O DATATAB	0- 2	1 3/8	+ 1/8	+15.0	A MSI DATA CORP	14-35	20 7/8	+ 1/8	+0.8
N MOWHAWK DATA SCI	10-18	14 1/4	0	0.0	O OYATRON CORP	2- 4	3 1/4	+ 1/8	+4.0	O NETWORK SYSTEMS CORP	8-34	31	+1 1/8	+3.7
N NCR	39-125	122 1/8	+14 5/8	+13.8	N ELECTRONIC DATA SYST	10-42	37 1/4	+3 1/2	+10.3	O ONEX	3- 6	5 1/2	+ 1/4	+4.7
N PERKIN-ELMER	17-35	33 3/4	+2 1/4	+7.1	N INFORMATICS INC	10-34	27 1/2	+1	+3.7	N PARADYNE CORP	20-30	22	- 1/4	-1.1
N PRIME COMPUTER INC	11-30	16 1/8	-4	-18.8	O INSYTE CORP	1- 3	1 1/2	0	0.0	O PENRIL CORP	7-14	12 1/8	- 1/2	-3.8
N SPERRY CORP	21-44	43 1/2	+4	+10.1	O IPR COMPUTER MARKET	1- 2	1 1/8	0	0.0	O RAMTEK CORP	12-26	15 1/4	-2	-11.5
O TANDEM COMPUTERS INC	14-34	29 3/8	+1 3/4	+8.3	O KEANE ASSOCIATES	4-15	12 1/2	- 1/4	-1.9	N RECONITION EQUIP	4-17	15	+ 1/4	+1.6
N TEXAS INSTRUMENTS	71-178	130 3/4	+8 3/8	+5.1	A LOGICOM	12-44	41 5/8	-1	-2.3	O SCAN DATA	1- 3	2 3/4	0	0.0
A WANG LABS "B"	13-42	38 1/2	- 1/8	-0.3	O MGT SC1 AMER INC	8-33	28	+2	+7.6	N STORAGE TECHNOLOGY	15-33	18	-1 1/2	-7.3
A WANG LABS "C"	11-42	39 1/4	+ 1/2	+1.2	O MATHEMATICA INC	12-28	26 1/4	- 1/4	-0.9	O SYKES DATATRONICS	8-27	10	- 1/8	-1.2
LEASING COMPANIES					O MATHEMATICAL APP GRP	12-22	16	0	0.0	A T BAR INC	7-17	15 1/2	+ 1/2	+3.3
O BOOTH FINANCIAL CP	22-60	58	+5	+8.2	O NATIONAL DATA CORP	5-28	22 3/4	+ 3/4	+3.4	A TAB PRODUCTS CO	8-30	25 7/8	- 3/8	-1.4
N COMDISCO INC	7-37	36 3/8	+1	+2.8	O PANSOPHIC SYSTEMS	8-30	23 5/8	- 7/8	-3.5	A TEC INC	8-12	7 1/4	- 7/8	-10.7
B COMMERCE GROUP CORP	1- 1	1/4	0	0.0	N PLANNING RESEARCH	8-21	18	0	0.0	N TEKTRONIX INC	34-87	81	+2	+2.5
O COMPUTER INVSTRS GRP	1- 2	1	0	0.0	O POLICY MONT SYSTE CP	38-59	55	+ 1/2	+0.8	O TELEX	5-31	30 3/4	+1 1/4	+4.2
O CONTINENTAL INFO SYS	5-32	28 1/2	- 1/2	-1.7	O PROGRAMIND & SYS	1- 8	5 1/2	+ 3/4	+15.7	O TESOATA SYSTEMS CP	3-15	14 7/8	+ 7/8	+6.2
N OFF INC	5-14	14	+ 1/8	+0.9	O REYNOLDS & REYNOLD	17-48	46 1/4	+ 1/4	+0.5	N TIMEPLEX INC	7-29	28 5/8	+ 7/8	+3.3
O ITEL	1- 3	1 1/2	0	0.0	O SEI CORP	11-34	27 1/4	-2	-8.8	O VISUAL TECHNOLOGY	9-28	20	+ 1/4	+1.2
O LEASPCORP	1- 2	1/8	0	0.0	O SHARED MEDICAL SYST	13-43	38 3/4	-1 1/2	-3.6	O WILTEK INC	1- 4	1 5/8	- 1/4	-13.3
N U.S. LEASING	18-47	41	+1 3/8	+3.4	O SCIENTIFIC COMPUTERS	8-14	13 1/4	- 3/4	-5.3	SUPPLIES & ACCESSORIES				
					O SOFTWARE AG	5-17	10 1/2	- 1/8	-1.1	N AMERICAN BUS PRODS	11-31	27	0	0.0
					N TYMSHARE INC	12-30	18	+ 3/8	+2.0	O BALTIMORE BUS FORMS	1- 2	1 1/4	0	0.0
					A URB CORP	5-18	17 1/8	+1 1/2	+9.5	N BARRY WRIGHT	13-31	28 3/4	- 3/8	-1.2
					N WYLY CORP	7-17	12 3/4	- 1/2	-3.7	O CYBERMATICS INC	1- 2	1 1/2	+ 1/2	+30.0
					PERIPHERALS & SUBSYSTEMS					A DUPLEX PRODUCTS INC	12-26	22 1/4	0	0.0
					P AM INTERNATIONAL	2- 7	5 7/8	- 1/8	-2.0	N ENNIS BUS. FORMS	5-25	21 3/4	-1	-4.3
					A ANDERSON JACOBSON	9-28	20 7/8	- 3/8	-1.7	N 3M COMPANY	48-80	84 1/2	+ 1/2	+0.5
					O AUTO-TROL TECHNOLOGY	8-28	28	+3 3/8	+14.8	N MOORE CORP LTD	28-51	46 3/4	-1	-2.0
					O BANCITE INC	7-33	21	+ 1/4	+1.2	N NASHUA CORP	8-22	22 1/4	+1 5/8	+7.8
					A BEEHIVE INT'L	4-15	12 3/4	+1 3/4	+15.8	O STANDARD REGISTER	11-34	32 1/2	- 1/2	-1.5
					A BOLT-BERANEK & NEW	9-52	54	+3 5/8	+7.1	N WALLACE BUS FORMS	11-30	27 1/4	-1 3/4	-8.0
					O CAMBEX CORP	2- 4	2 3/8	- 3/8	-13.6					
					N CENTRONICS DATA COMP	8-28	28 3/4	0	0.0					
					A CETEC CORP	4-12	8 7/8	0	0.0					
					O COONITRONICS	2-20	13	- 5/8	-4.5					
					O COMPUTER COMMUN.	1- 2	2	0	0.0					

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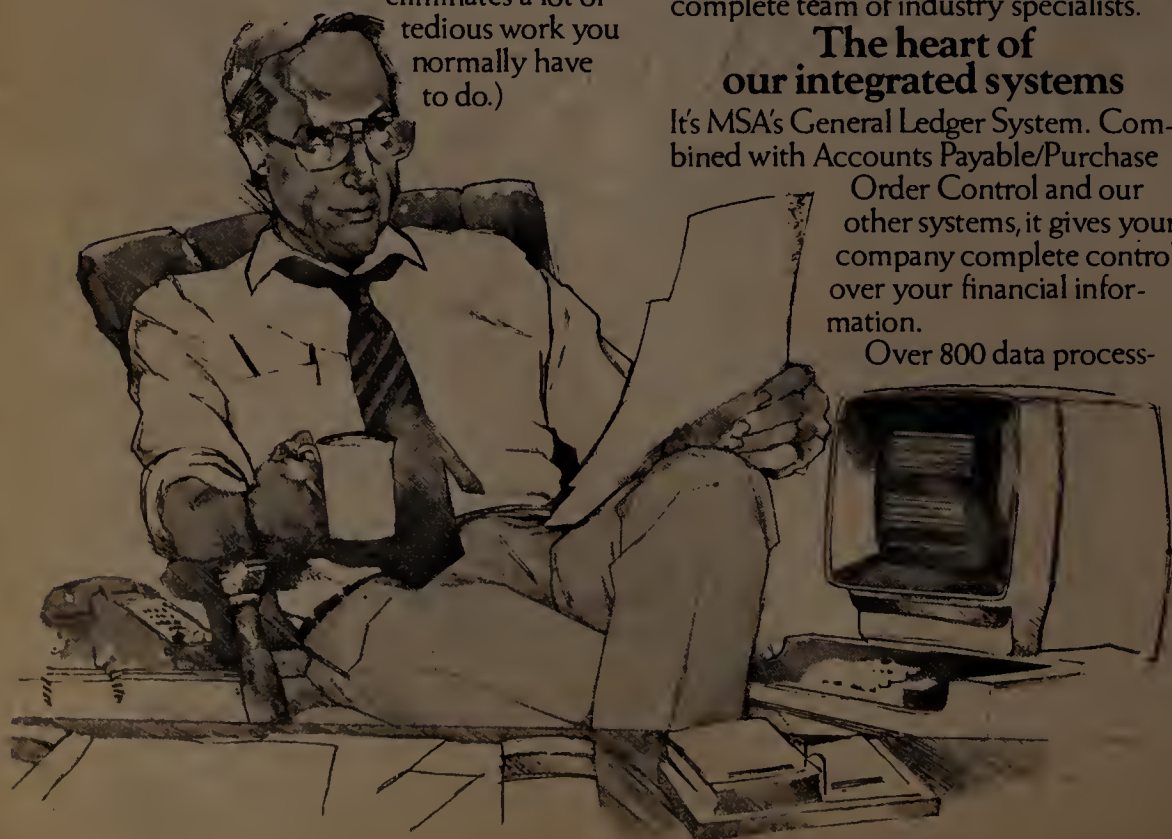
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Do you develop this software yourself or do you simply market it for another company?

4. Are your systems truly online so all of our information is current?

How many of your systems are online? How secure are they?

5. Will my company have to be the one that discovers the bugs in your brand new system?

Just how long have your systems actually been used, and how have they been tested?

6. Will you update your systems as technology advances and regulations change?

What are some of your most recent updates? Will you keep us current on regulatory changes?

7. Do your systems really do everything you say they will?

Or will we have to change them or add to them to get the features we want?

8. How long have you been in business?

What are your revenues? What is your growth record? Where will your company be five years from now?

9. How many systems has your company installed?

How many of these were installed in the past six months? How many of your earlier customers are still using—and liking—your systems?

10. Do your financial systems handle unlimited foreign currencies?

Do your financial systems use a common set of currency exchange rates?

11. Can you link our executives' computers directly to the mainframe—so they can get their own information?

Is that software available right now?

12. How will you make sure our own people thoroughly understand your system?

Do you have educational centers near us, or will we have to travel all the way across the country to find one? Will you be there to help during installation and after?

13. How many of your people specialize in software for my industry?

How many accountants work for you? Human resource specialists? Manufacturing experts?

14. Do your systems have built-in features that make them easier to use?

What happens if someone needs help figuring out a feature? Do you have online documentation that's easy to understand?

15. As my business changes will your system be flexible enough to change with it?

Or will we have to pay a lot to revamp it? Or even regenerate it?

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| 5. Capital Expenditure Tracking |
| 6. Forecasting & Modeling |
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